BRITISH MEDICAL JOURNAL

LONDON SATURDAY JANUARY 23 1937

CANCER OF THE BREAST *

BY

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It is natural that those of us who spend a large part of our lives in the Royal Cancer Hospital should regard cancer of the breast as a very common disease; and so it is within the walls of that hospital, as will be appreciated when I say that about one hundred cases come for treatment every year.

But of course we cast our net wide, and in order to get a true picture of the real frequency of the disease it is necessary to think statistically for a moment and to remember that while there are over 33,500 doctors in England, there would appear to be not more than 6,500 fresh cases of cancer of the breast each year. Equally divided among us all, this number gives only a fifth of a case apiece. It follows, therefore, that cancer of the breast is not really common enough to enable many of us to have enough personal experience to assess the value of different methods of treatment. We are all apt to be unduly influenced by one case—often the last one seen—and all sorts of fallacies result. One practitioner who has recently had one or two good results following upon operative treatment may think it is all that can be desired; while another man in the next street, having recently seen a case of recurrence, thinks all treatment useless and the disease hardly worth treating.

As is usual in so many other problems, the truth lies somewhere in between, and I want to show both sides of the picture. On the one hand we see grounds for the greatest optimism, and on the other bitter disappointments and heart-breaking failures. But in spite of these variations cancer of the breast is a disease which, in the aggregate, does notably maintain a very steady average picture.

Some Figures

Let me give you some figures. Consider, for instance, cases of cancer of the breast in which no active surgical or radiological treatment has been employed. Of course we cannot get such figures now, as all cases are treated by one or other of these methods; but there are plenty of statistics worked out by an earlier generation, and they show that on the average a woman with cancer of the breast lived three and a half years when no treatment of any kind was carried out.

This is a very important figure, for it is upon this datum line that the average success or otherwise of any method of treatment must be judged. And what do we find? The statistics so carefully collated and analysed by the Ministry of Health show that operative treatment, even at its very worst (for its figures only relate to patients that died of recurrence after operation) adds three years to this average; so that women with cancer of the breast who come for surgical treatment may expect to live an average of six and a half years from the first onset of the disease. This is the worst. What is the best that can be expected?

History of Surgical Treatment

But before discussing after-results, let me recall the history of the surgical treatment of breast cancer. It is a long story in point of time, for it goes back to the dim ages at the dawn of surgical history, when the cancerous breast was excised by the crude methods then available. And for century after century the same primitive local excision continued to be practised until the coming of Lister put surgery on a different basis. Surgeons were no longer compelled to make their operations as simple as possible owing to the certainty of infection of the wound; they were now able to plan their incisions, fashion their flaps, dissect out the muscles, and, indeed, fit their operations to meet the conditions imposed by the disease. Pathological anatomy began to play its part in dictating an operative scheme, and surgeons ceased to be artisans and became pathologists as well.

In 1894 Halsted gave us what is to all intents and purposes the modern operation for amputation of the breast. His operation was based on the pathological anatomy of the cancerous breast and its extensions, and upon observation of the most usual sites for secondary nodules and recurrences. It at once put the outlook for these cases on a different footing, but in spite of great improvement in results critical study of the after-history of the cases revealed a disappointing percentage of failures.

The next great step forward was Sampson Handley's enunciation of the principle of lymphatic permeation and the planning of various modifications of the Halsted operation, with a view to meeting the situation indicated by his theory. Very briefly, the salient points were a less wide removal of the skin (which was a great blessing both to the patient and to the surgeon) and a much wider removal of the deep fascia in which the vulnerable lymphatics lay. Although there are many who do not accept Handley's views in their entirety, yet one notices that it is Handley's operation that is the standard technique employed in every clinic in the surgically civilized world, and this operation may be said to represent the zenith of the purely surgical treatment of cancer of the breast.

It has often been said of the breast, as of other organs, that operative treatment has reached its limit. Although it is true that a limit has probably been reached as to the amount of tissue removed (for some surgeons say they remove everything but the bones), yet as to the method of its removal, who can say what the future may have in store for us? We had an indication of the sort of development that may take place when the use of the

* A lecture delivered at the annual meeting of the Oxford Medical Society on November 13th, 1936.

diathermy knife was introduced for removing the breast. This was a fundamental change in technique which had its day, and in fact still has its day in certain chosen cases, more especially in advanced or ulcerated cases, when local infection is a special risk.

Points in Amputation of Breast

I am not going to describe the technical minutiae of amputation of the breast, but I would like to emphasize certain points of importance that are sometimes overlooked.

The first is the value of a routine radiological examination, especially of the spine and thorax, in order to eliminate those not very rare cases in which an unsuspected bone metastasis has already established itself. During the actual operation I would lay chief stress on the importance of avoiding cooling of the large surface of the wound, and of making sure that one's assistant is not leaning too heavily upon the other side of the thorax. It is important, too, that tension on the stitches should be avoided at all costs in order to prevent that aseptic sloughing of the flaps that is one of the most troublesome complications of this operation. The only special point in the immediate post-operative treatment is to avoid the painful and trying method of fixing the arm at right angles to the body, which is sometimes employed in the mistaken belief that it will prevent post-operative stiffness. Shock and loss of blood are, of course, to be guarded against and to be remedied, either by blood transfusion or by continuous intravenous glucose saline.

It is hardly possible to say that any operation can be expected to be entirely free from mortality, but the mortality from amputation of the breast should be, and at the Royal Cancer Hospital is, almost negligible. Personally I have been lucky enough to lose only one case, and in this case death took place from that still mysterious disaster—pulmonary embolism.

Post-operative morbidity also is extremely low. Infection of the wound is rare, and the stiffness of the shoulder so greatly feared by the earlier operators is a complication that we never meet with now. Indeed, it is amazing to think that so destructive and mutilating an operation should be followed by so little disability. The removal of the greater portion of the pectoral muscle and the whole of the pectoralis minor as well, does not appear to prevent quite respectable performances on the golf course or the tennis court, to say nothing of a hard day's work in the house.

Results of the Operation

What are the results that we may expect after such an operation as I have described, undertaken by an expert operator under ideal conditions, in an otherwise healthy woman? We know only too well; for the best statistics, furnished by the best surgeons in the world, show that less than half their patients will be free from any signs of the disease at the end of five years, even when the growth is in its earliest stage, apparently confined to the breast itself, and where no evidence of invasion of the glands can be detected on the most careful microscopical examination. In cases in which the disease is more advanced—where, for instance, the axillary glands are palpable on examination and found to be invaded on pathological investigation—the figure drops to something like 20 per cent. And when our cases are later still and have reached the stage in which the most casual glance is enough to determine the diagnosis, then the survival rate drops to almost nothing.

Do not misunderstand me, for there are, of course, brilliant exceptions, and quite advanced cases are sometimes operated upon so successfully that the patients come to forget that they have ever been ill. But unhappily the converse of the picture is also true, and the earliest and apparently most favourable cases will sometimes develop recurrence within a few months. We surgeons have to live a long time before we have lived long enough to have had the unhappy experience of seeing many of our best efforts and our most favourable cases disappoint us in this grim fashion. But we all come to it in time, and we must face the fact that the last few years have not seen any marked improvement, or indeed any improvement at all, worthy of the name, in the results from purely surgical treatment. It is natural, therefore, that we should turn to other methods in the hope of some support for our surgical attack.

X Rays as an Adjunct to Operation

We have two important agents at our disposal—*x* rays and radium. As in *x* rays we have an agent which is easily applied, is free—or almost free—from danger, and is available at a good many centres, the custom has gradually developed of giving patients subjected to surgical operation a course of *x*-ray therapy as well. There is a good deal of controversy as to whether it should be administered before or after the operation, and there is much to be said in support of either method. Those who favour prior *x*-ray treatment point out that the activity of the tumour may be diminished; that sparsely scattered outlying cells may be destroyed; and that the danger of cell dissemination during the subsequent operation will be reduced to a minimum. Against this is urged, first, the delay in operative treatment that inevitably results from it; secondly, the possibility that the operation may be more difficult and healing more protracted (although personally I think that this objection is without much weight); and, thirdly, that the tumour may be shown by the operation not to be malignant at all.

But to my mind the real objection to the use of deep therapy before operation is psychological. In all conscience it is sometimes difficult enough to persuade a patient to submit to amputation of her breast; it is still more difficult if it is explained that she must first undergo a course of three or four weeks' treatment before the moment for operation arrives. My own feeling, therefore, is that if *x*-ray treatment as an adjunct to surgical operation is carried out at all, it should be done after the operation, and there seems to be no objection to starting it within a very few days of the healing of the wound.

There would appear to be good ground for claiming that pre-operative or post-operative deep therapy has already effected some improvement in results, although it is too soon yet to say whether or no an intensive trial of this method is going to make a really great improvement in our ultimate statistics. But its application is so rational and so safe in skilled hands; the power and scope of *x*-ray apparatus is improving so rapidly; and, moreover, it is so urgent that something be done to better our results that I hold the view that all our cases of radical amputation should receive it.

Radium Therapy

The other great adjunct to surgery is radium, and in its use for cancer of the breast Handley again deserves an honoured place among the pioneers. Long years ago he pointed out that one of the difficulties of surgical operation was the impossibility of following the lymphatic tracks that wind through the upper intercostal spaces to reach the thorax, and he endeavoured to overcome this short-

coming of the radical operation by implanting tubes of radium into the vulnerable intercostal spaces.

Then we pass to another stage. Regaud's work in establishing the value of the long-continued application of small quantities of radium, widely scattered through the affected area, gave a new impetus to the treatment of cancer of the breast by radium therapy. A large number of advanced cases, unsuitable for surgical operation, were subjected to this new form of treatment. The results in many cases were dramatic—so dramatic that it was apparent that a new method had evolved which was likely to have far-reaching consequences. And so it had, for within a comparatively short time Keynes at St. Bartholomew's Hospital began to undertake the treatment of early operable cases of cancer of the breast by interstitial radium. And Keynes was soon followed by a good many other surgeons, who felt sufficient dissatisfaction with purely operative methods to lead them to embark upon this new experiment. It was a venture for which there was much support to be found, not only in the results obtained in such sites as the lip, tongue, and cervix uteri, but also in the highly satisfactory—though only temporary—benefits resulting from the radium treatment of even the most advanced cases of cancer of the breast. The accessibility of the breast, its ease of observation, and the large number of cases available for comparison, coupled with the extreme willingness of the patients to submit to this new form of treatment, all combined to give a powerful impetus to the method. This resulted in a large number of cases being dealt with on these lines in London, New York, and other great centres. We naturally played our part at the Royal Cancer Hospital in seeking opportunities for a test of what we may call the radical radium treatment of early cases.

Radical Radium Treatment of Early Cases

Very briefly, the technique employed consisted in the implantation of radium needles of various lengths in such a way as completely to penetrate and surround the primary focus and the areas of probable lymphatic spread. At the Royal Cancer Hospital we used platinum needles containing radium salt. In New York they rather specialized in radon, contained in gold capillary tubes, which have the great advantage that they can be obtained in almost unlimited quantity and in sections of great length.

These are all matters of detail and of no fundamental importance, providing the quantity of radium or radon is sufficient, the duration of dosage long enough, and the spacing and distribution suitably planned to meet the circumstances of the case.

What are the results to date? It is early days to give carefully analysed figures of the ultimate or even interim fate of our patients, for this is a matter of years. But it is fair to say that on the whole the results support the view that this method of treatment does give results which are at least comparable with those obtained by operative treatment. But statistics alone, until they become so overwhelming in quantity and quality as to prove a point beyond all discussion, are not always sufficient by themselves to determine current practice. And it becomes pretty clear what the general feeling of most of the surgeons at the Royal Cancer Hospital is when I tell you that the proportion of radical amputations carried out there has increased in the last year or so. The pendulum is swinging back, or has swung back, to the operative treatment of early cases.

Of course, as in all experiments that show some measure of success, one tends to be too optimistic, and I think now that we were all perhaps a little too hopeful that a method had been achieved which would do as much or more for our patients than operative treatment, and would at the same time spare them the distress and mutilation of amputation.

Difficulties of Radical Radium Therapy

Radical radium treatment did not prove quite as simple as we had hoped. In the first place, the amount of work involved in recording, sketching, and following up the cases enormously added to the clerical work of the hospital, and of course to the expense. We were faced with the constant difficulties occasioned by stupidity on the part of patients who could not or would not understand the necessity for a careful follow-up, and perhaps the need for further treatment. But above all, we were faced with new conditions not hitherto experienced: extensive radium burns and their explanation and treatment; and in particular the difficulty caused by the fact that some of the tumour masses failed to resolve in spite of intensive treatment. And what, then, was to be done with them? Further long exposures, and the possibility of really serious burns? Or surgical removal and invalidation of the whole experiment? Some of the masses were removed, of course, and found to contain living cancer cells. But the fate of similar masses that had not been removed served strongly to suggest that the cancer cells in question had been reduced to a condition of inactivity, although no man could say how long such inactivity might be expected to persist.

Some of these difficulties are of a nature that time, increased facilities, better team work, and a clearer comprehension of their origin will in due course adjust for us. But some of them are fundamental to the method, and I see no way of getting over them. I have some doubt as to whether any successful plan of campaign of this sort will ever be evolved which will give us what we scarcely have the right to ask of any method. For we expect our method to deal with a disease of which the nature is unknown, its precise method of extension only suspected, and its growing edge an indeterminate nebulous zone which in one case may be confined to the breast, and in the next (to all appearances quite identical) may already have extended within the chest itself. It is difficult to imagine any possible distribution of radium which will overcome these obstacles. My view, therefore, is that in the present state of our knowledge all early and favourable cases should be subjected to radical operation.

But what are we to do if during the course of an operation for what looks like an early favourable case we discover that the disease is more extensive than anticipated, and the glands obviously and grossly invaded up to the apex of the axilla? In these cases I always remember that I am faced with the possibility not only of failing to do good but of really doing harm. What surgeon is there who cannot recall instances when a radical operation in an advanced case of this kind has been followed by widespread local dissemination, extensive cancerous infiltration of the skin and subcutaneous tissues, and early onset of that most distressing complication of all—the mammoth arm? Accordingly, when I am faced with this situation (and this is where I perhaps differ from some of my surgical colleagues) I am tempted to remove only the grosser part of the disease, leaving a respectable margin of healthy tissue to cover over what I have had perforce to leave behind, in the hope that other treatment may succeed in doing what I have failed to do with the knife. In such cases I believe that radium

is of great assistance, and I subject them either at the time, or later, to an intensive barrage of radium needles.

The Value of Radium

I must not leave you with the view that I am a pessimist about the value of radium. Indeed, anyone who has worked in cancer for as long as I have can be nothing but an optimist when he compares the composite picture of cancer treatment and its results at the present time with what they were ten years ago. The whole aspect of affairs has changed. Tongue, mouth, pharynx, uterus, and breast have all shared in the general amelioration, some more than others, some less; and I should emphasize that it is only in so far as the treatment of early breast cancer is concerned (where our hopes were high) that radium has disappointed me. But it is only a relative disappointment. Radium has furnished us with the most valuable method of special treatment of cancer of the breast at our disposal, and it would be utterly impossible to do without it for our advanced cases, or for those which for any other reason are inoperable.

Deep therapy is catching it up, but it has not caught up yet. However, my radiological colleagues tell me that the time is coming when they will be able to provide us with an *x*-ray beam comparable in the shortness of its wavelength with the gamma rays of radium, but delivered with an intensity and in such a quantity as no source of radium supply is ever likely to attain, unless, of course, radium becomes available in almost unthinkable quantities. When that time comes, or when *x* rays do become equivalent in power to the gamma rays of radium, a new and happier chapter in the history of cancer of the breast will open, and we surgeons once again will have to pause and reconsider our position.

Early Diagnosis

You will observe that I have said nothing yet as to the diagnosis of cancer of the breast, and after all, it is the most important preliminary to treatment, whatever that may be. I think the most vital point about diagnosis is to remember that it is daily becoming more difficult. The influence of propaganda has been so great and so much has been written in the lay and medical press as to the importance of obtaining treatment at the earliest possible moment, that our cases are coming to us at a very much earlier stage than they ever have before. The diagnosis of a well-developed cancer of the breast is easy; but the diagnosis of a tiny lump no bigger than a pea is sometimes quite impossible until it has been removed. One sometimes hears an argument as to whether there is any danger in cutting into a breast tumour for verification of its nature. I believe there is danger; and I think that in those cases, increasing as they are in number, in which it is impossible to feel confident as to the nature of a suspicious nodule, it should be completely removed, with a fairly wide margin of healthy tissue round it. Then, and only then, should it be bisected, when its nature will almost always be at once apparent to the naked eye.

It is interesting to note that a special investigation carried out by the Imperial Cancer Research Fund, on "the importance of microscopical investigation," showed that the diagnosis of cancer of the breast was less often incorrect than that of cancer in any other part of the body.

It is obvious, I suppose, that the removal of these doubtful tumours of the breast should only be undertaken by surgeons who have had that long practical training in laboratory and operating theatre which gives them the ability to recognize the nature of the tumour they are dealing with and the capacity for coping with unexpected situations.

Frozen sections are sometimes employed as an aid to diagnosis in the operating theatre, and they are of the utmost value in certain sites. But I feel that when an experienced practical surgeon is in doubt about the naked-eye appearance of a breast tumour the frozen section is just as likely to be as difficult of interpretation as the gross pathological picture.

One other matter that I must not omit. Do benign tumours of the breast ever become malignant? I think not; but it is clearly not a question capable of final proof. If we see a little tumour to-day and tell the patient "I think that is an adenoma, and therefore do not bother about it," and she comes back a year hence with carcinoma, that does not prove that a simple tumour has become malignant; it merely shows that we have been most unwise and have overlooked a carcinoma in its very early stage. Who can say with positive certainty that a lump is simple or malignant until it has been removed? I cannot, although I can generally venture a pretty shrewd guess, and I am quite often right; but I am also often wrong. There can be no excuse for that pernicious practice, the results of which we still sometimes see, of telling a woman not to bother about a lump in the breast unless, or until, it gives trouble. When it does give trouble it is trouble indeed.

A Working Plan

In conclusion, I should like to feel in a position to give you absolutely emphatic, positive guidance as to what you ought to advise in breast cases that come to your notice; but I do not think that the position is such, especially at the present moment, as to lend itself to emphatic pronouncements. I have, however, developed for myself a fairly definite working scheme, based upon a long experience and upon much thought about my own work and observation of that of others.

My attitude is that all operable cases of cancer of the breast should be subjected to radical amputation, followed by a course of prophylactic high-voltage and short-wavelength *x*-ray therapy. But, you will say, what constitutes an operable case? And here we are on debatable ground. Let me first of all tell you of the cases that I regard as *surgically inoperable*. I put first those with widespread extension of the growth; or those with secondary skin nodules, or indeed one nodule outside the breast area; or wide ulceration or oedema of the skin; or enlargement of the supraclavicular glands; or the presence of a distant metastasis; or involvement of both breasts; or enlarged fixed glands in the axilla.

But there are other factors, too, which render a case inoperable. I may call them medical. And among these I include pregnancy and lactation; serious intercurrent disease; extreme youth (for example, cancer occurring under the age of 25, as in my experience surgical treatment here is always hopeless); or in such extreme old age that the general expectation of life is less than the average duration of the disease.

If we exclude all these, it leaves us with those patients who are not too young nor yet too old; whose tumour is confined to the breast itself and not adherent to the chest walls; in whom the axillary glands have not become grossly enlarged, and where no metastasis can be discovered.

Of course old age in itself is not a bar to operation, providing the general condition of the patient is satisfactory. I operated upon one patient of 82, who survived

ten years. Nor is the mere size of the primary growth of first importance, as long as the extension is outward as it were, and not inward towards the chest wall.

So far the indications are clear and our course is easy. But what are we to do for patients not suitable for radical operation? We will consider first those whose unsuitability derives from general causes, and not from the condition of the local disease—the very young, the very old, the very feeble, the diabetic, those with very high blood pressure, and, of course, those who absolutely refuse operative treatment. Here, too, I think our course is clear. Interstitial radium treatment carried out on a comprehensive scale unquestionably offers these patients their best chance of long survival.

Then we come to the cases where radical operation is unsuitable owing to the extent of the primary disease, or to gross involvement of the axilla, or even slight involvement of the supraclavicular glands. Here I believe the best course to be a strictly limited operative removal of the tumour and surrounding breast tissue, followed by implantation of radium needles in the axilla and the usual lymphatic paths. One cannot but feel that by removing the major portion of the disease one has put the patient's tissues in a better position to take advantage of the effects of the subsequent radiation therapy. This limited amputation has also proved of great value in my hands in cases where ulceration of the tumour is imminent, or has already become established.

Lastly, we come to the class in which the local condition is more widespread, and where skin nodules, peau d'orange, diffuse invasion of the breast, or involvement of both organs is manifest. In these, again, our course is quite clear. They are naturally quite unsuitable for surgery, and the disease is too extensive for the rather limited powers of radium—I mean, of course, limited in the geographical sense. Deep therapy is the method of choice in such cases as these, with the proviso that the voltage should be as high as possible, and the beam should be delivered with all the intensity that the tissues will stand.

It sounds somewhat paradoxical, but it seems to me that it is in some of the most widespread, and therefore by ordinary standards our most hopeless cases, that the most brilliant results of *x*-ray therapy have been obtained. Their lives are not saved, but they are prolonged in a high degree of comfort for very long periods. It is certain that my *x*-ray colleagues have taught me that we must never accept final defeat in these cases of advanced breast cancer until visceral metastases afford unmistakable evidence that the end is near.

The Northcote Trust, which deals largely with the social supervision of the patients at St. Thomas's Hospital, has completed its twenty-seventh year of work, and its last report covers the twelve months ended October, 1936. It records a real improvement in housing conditions and unemployment, and illustrates the work which the almoners undertake. Help is forthcoming in necessitous cases in ways such as the obtaining of employment, the provision of convalescence treatment, the after-care of cancer cases, and nursing at home. The Northcote Trust Hostel for Girls has been rebuilt, and since its reopening last August has had a full complement of girls and infants. Patients visited at home during the twelve months under review numbered 333; 898 were assisted in other way than by the provision of convalescence facilities or surgical appliances; 993 received convalescent treatment; and 787 surgical instruments were supplied. The income of the Trust during the year was £2,810, and there was a small credit balance at its close.

VARIATIONS OF WEIGHT DURING PREGNANCY*

BY

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The importance of weight-taking during pregnancy and the significance of an abnormal increase has attracted very little attention in this country.

In 1862 Gassner showed that there was a progressive increase in weight of the mother which was greater than that due to the foetus and the hypertrophied reproductive organs. He found that during the last three months of pregnancy there was an average increase of 3.5 to 5.5 pounds. Zangemeister (1916) advocated weight-taking as a means of detecting incipient toxaemia, and in 1925 he showed that during the few days immediately preceding labour there was a definite loss in weight. Hirsch (1922) demonstrated a loss of weight a few days before labour, and ascribed this decrease to the activity of the hypophysis.

Davis (1923) found that the usual gain during pregnancy was 20 pounds. He came to the conclusion that weight-taking should be a routine practice in ante-natal work, since it gave information about latent dropsy. In the same year Hannah found an average gain of 12 pounds during pregnancy. Wieloch (1924) stated that the tendency towards insidious oedema could be detected by systematic weighing of the patient. Randall (1925) found that the average gain in primiparae was 23.2 pounds, and in multiparae 21 pounds. He concluded that the extent of the increase in weight should aid materially in foretelling the toxaemias of later pregnancy.

Slemons and Fagan (1927) found the average gain to be 16.5 pounds. Toombs (1931) made comparisons between the mother's gain during pregnancy and the infant's weight, but failed to establish any relation. Bingham (1932) stated that abnormal weight increase was a precursor of toxaemia, and that it also tended to make the labour more difficult owing to the deposit of fat in the pelvis. He found that the child tended to be larger in proportion to the increase in weight of the mother.

Siddall and Mack (1933) reported that the total gain during the last four months of pregnancy was 15.7 pounds, and concluded that excessive weight gain appeared to be of questionable value in the early recognition of impending toxaemia. Cummings (1934) found the total gain in the first trimester of pregnancy to be less than half a pound, in the second trimester 13 pounds, and in the third trimester 11 pounds. The greatest gain occurred during the sixth and seventh months, in which it was 5 pounds. He stated that an abnormal gain in weight was a very early sign of the toxaemias of pregnancy. During the same year Harding and Van Wyck came to the same conclusion, and therefore advised the practice of weight-taking in pre-natal care.

The present investigation was undertaken to determine the weight increase in normal and toxaemic cases in an attempt to establish standards and to ascertain what significance could be attached to an abnormal gain.

Method of Investigation

Each patient was examined during the last few months of her pregnancy, weekly, fortnightly, or monthly, depending on the findings at the previous examination. A history of any previous illnesses and pregnancies was taken at the first visit, together with a history of the present pregnancy. A general systematic and obstetrical examination was also made; the patient was weighed, the blood pressure taken, and an examination of the urine performed.

* Investigation undertaken during the tenure of a British Medical Association Research Scholarship.

At each subsequent visit the patient was weighed, similar clothing being worn. The blood pressure was determined, the urine was examined, and any untoward symptoms were noted.

Gain in Weight during a Normal Pregnancy

Our first consideration must of necessity be the average gain during a normal pregnancy. During this investigation 211 patients were examined; of these, thirty-seven developed albuminuria and a further fifteen cases had toxaemia although no albuminuria occurred. These fifty-two cases cannot be considered when the increase in weight during a normal pregnancy is discussed. The average monthly gain in the 159 normal pregnancies was 2.8 pounds during the last three to four months. The gain was similar in the seventy-seven primiparae to that of the eighty-two multiparae—namely 2.8 pounds.

There are contradictory statements in the literature with regard to comparisons in the gain in weight of primiparae and multiparae. Cummings states that in his series primiparae gained 0.1 pound more on the average throughout pregnancy. Hannah also finds that there is a slightly greater gain in primiparae during pregnancy. Others, however, state that there is no appreciable difference in the increase in weight in first pregnancies as compared with succeeding pregnancies.

Although the average increase each month was only 2.8 pounds a number of patients gained considerably more than this during a particular month, one even gaining as much as 12 pounds. Owing to this fact it was thought advisable to obtain in every case the *greatest* gain in any one month, in order to ascertain the average for this figure. This was found to be 4.8 pounds in the primiparae and 4.4 pounds in the multiparae, the average in the 159 cases being 4.5 pounds.

Gain in Weight during a Toxaemic Pregnancy

As stated previously, thirty-seven patients developed albuminuria, due to a mild or severe toxaemia, and a further fifteen had a mild toxaemia although no albuminuria occurred. The average weight increase per month of these thirty-seven albuminuric cases was 4.4 pounds, that of the eighteen primiparae being 5 pounds and of the nineteen multiparae 4 pounds. The average *greatest* increase in any particular month was found to be 8.1 pounds, the average in the primiparae being 8.4 pounds, and in the multiparae 7.9 pounds.

In the fifteen cases of toxaemia which did not show albuminuria treatment such as diet and rest was instituted when the symptoms and signs were first noticed; this may explain the subsequent absence of albuminuria. Most of the patients had a raised blood pressure (not less than 140/85 mm. Hg); headaches, eye symptoms, nausea, and oedema of the ankles were present in a varying degree. The average monthly gain in these fifteen cases was found to be 4.2 pounds, whereas the average *greatest* gain in any one month was 8 pounds.

This table shows that the average increase in weight during each of the last three or four months, the period when most toxaemias develop, was almost 2 pounds more in the cases which were eventually toxaemic. More striking than this, however, is the sudden abnormal increase in weight in any particular month. The cases in which eventually there was toxaemia had gained on the average 8.1 pounds during one month, whereas the corresponding figure in the normal cases was only 4.4 pounds. In other words, the toxaemic cases had gained almost double the normal amount at some time previous to the appearance of the toxaemia.

TABLE I

	No. of Cases	Average Increase per Month	Average of Greatest Increase in any One Month
Normal cases	159	2.8 lb.	4.4 lb.
Toxaemic cases (no albumin)	15	4.2 lb.	8.0 lb.
Toxaemic cases (albuminuria)	37	4.4 lb.	8.1 lb.

Forty-one cases gained more than 8 pounds during a particular month, and twenty-six of these (63 per cent.) became toxaemic at some later date. On the other hand, 107 cases did not have an abnormal increase—namely, above 5 pounds during any month—and amongst these only one case (0.9 per cent.) developed toxaemia. Table II illustrates this fact.

TABLE II

Greatest Increase in any One Month	No. of Cases	No. of Toxaemic Cases	No. of Normal Cases	Percentage Toxaemia
Over 8 lb. ...	41	26	15	63
Between 6 and 8 lb.	36	17	19	47
Between 5 and 6 lb.	27	8	19	29
Below 5 lb. ...	107	1	106	0.6
	211	52	159	

If the toxaemic cases in Table II are taken separately it will be seen that fifty-one of the fifty-two cases (98 per cent.) had increased over 5 pounds in weight during one of the later months of their pregnancy, 50 per cent. gaining over 8 pounds, 32.6 per cent. between 6 and 8 pounds, 15 per cent. between 5 and 6 pounds, and only 1.9 per cent. below 5 pounds. It should also be pointed out, however, that fifty-three (33 per cent.) of the 159 cases in whom no toxaemia ensued had an increase of over 5 pounds during a particular month. Therefore, an abnormal increase in weight does not invariably signify that the patient will develop a toxaemia.

Abnormal Increase in Weight as an Early Sign of Toxaemia

We must now consider at what time, in relation to the toxaemia, this sudden increase in weight appears. In thirty-seven patients who developed albuminuria thirty-five showed an abnormal gain in weight, 5 pounds or more per month, before albumin appeared. One of the remaining two cases had albuminuria on the same day as the abnormal increase in weight was noted, and the other was the only case in which no abnormal gain was found. The albuminuria did not appear immediately in the thirty-five cases, but was found on the average twenty-nine days later, the longest period being ten weeks and the shortest five days.

Rise of blood pressure is known to be an earlier sign than albuminuria in a toxaemia of pregnancy; it would therefore be of interest to consider when this sign appeared in relation to the abnormal gain in weight. Seven of the thirty-seven patients had a raised blood pressure before the abnormal weight increase was detected, and in a further three cases the rise in blood pressure seemed to coincide with the increased gain. In the remainder, if the blood pressure rose, it did so after the abnormal gain was shown. In the fifteen cases in which no albuminuria occurred one patient had a rise in blood pressure one month before any abnormal increase in weight was detected. An increased gain and a raised

blood pressure were found at the same examination in six cases; in a further six the blood pressure was raised on the average three weeks after the weight increase. One of the remaining two patients complained of headaches and "spots before the eyes" six weeks after the abnormal weight increase, there being no rise in blood pressure; the other patient developed oedema of legs, hands, and face three weeks later, the blood pressure being 130/80 mm. Hg. The following table gives the first indication of a toxaemia noticed in the fifty-two cases under consideration.

TABLE III

First Indication of Toxaemia	No. of Cases	Percentage
Abnormal monthly increase in weight... ...	34	65.3
Abnormal monthly increase in weight and raised B.P. simultaneously	9	17.3
Raised blood pressure	8	15.3
Albuminuria	1	1.9

It would appear, therefore, that an abnormal increase in weight during any one month is usually an earlier indication of an impending toxaemia than a rise in blood pressure.

Loss of Weight before Labour

Loss of weight of the mother immediately before labour was found in only seventy-three of 207 cases, a percentage of 36. In this series of cases, therefore, an impending labour could not have been diagnosed by the loss of weight of the mother. These findings are comparable with those of Cummings (1934) and Siddall (1933); the former found that 40 per cent. and the latter 24 per cent. of their patients had lost weight before labour.

Relation between Abnormal Weight Increase and Type of Labour

As mentioned previously, Bingham found that an abnormal increase in weight predisposed to a more difficult labour. In this series of cases fourteen primiparae and fourteen multiparae had an average gain of more than 5 pounds per month; the remainder had an average monthly gain of less than 5 pounds, although some may have gained more than 5 pounds in a particular month.

The duration of labour and the forceps rate in these two groups are shown in Table IV.

TABLE IV

	No. of Cases	Average Duration of Labour	Forceps Rate
Primiparae (not overweight) ...	86	17 hours	24 (27%)
Primiparae (overweight)	14	18.2 hours	4 (28%)
Multiparae (not overweight) ...	97	11.4 hours	9 (9%)
Multiparae (overweight) ...	14	11 hours	1 (7%)

The number of patients overweight is small, therefore great stress cannot be laid on the result of the comparison, but it is evident that in the cases under consideration the type and duration of labour was not affected by the weight increase of the mother.

Discussion

Increase in weight must obviously take place during a normal pregnancy, but observers differ as to the amount. In the articles quoted the figure varied from 12 to 24 pounds. Many of the causes of the increase are self-evident—namely, the foetus 7 pounds, the placenta 1½ pounds, the amniotic fluid 2½ pounds, and the enlargement of the uterus and its appendages 2 pounds.

The general increase in the tissue of the mother, including hypertrophy of the breasts, must account for some gain in weight, which would vary with the type of woman concerned. It is difficult to arrive at an average figure for this increase, but it would probably be between 2 and 4 pounds.

The increase in blood volume which takes place during pregnancy must cause a small part of the gain. The blood volume is about 7 per cent. of the body weight, and would therefore be 8.8 pounds if the average weight of a woman of child-bearing age is taken to be 9 stone. The blood volume has increased at least 20 per cent. at term, thereby accounting for a gain of 1.6 pounds.

During the first trimester it is universally agreed that there is very little variation in weight, some patients losing a little and others gaining, depending probably on the ease with which the body adjusts itself to the presence of the ovum. The increase which occurs must therefore take place during the last six months. It is suggested, both on theoretical grounds and from the above results, that the average monthly gain during the second and third trimesters should be between 2 and 4 pounds, and the total gain 16 to 18 pounds. If the gain is greater the patient should be questioned carefully, and be examined in order to find, if possible, the cause of the discrepancy.

In the 211 cases under consideration it is clear that systematic weighing of the patient was of definite value in foretelling a toxaemia of pregnancy. The average increase in weight of a potential toxaemic patient was definitely more than that of a normal patient, but it was not sufficient to be of real clinical value, since the 4.3 pounds, which was found to be the average monthly gain of the toxaemic patients, was as a rule gained by the normal cases during one of their later months. If, however, the patient has a *monthly* gain of 4 to 5 pounds in two or more consecutive months it should be regarded as abnormal; dietetic errors, if present, should be rectified and a stricter supervision undertaken.

On the other hand, a sudden marked rise in weight during one month, particularly if at least twice the normal gain, is of great help in foretelling a toxaemia. If the patient showed a monthly gain of 8 pounds or more there was a 63 per cent. chance of her developing a toxaemia, and following a 6 to 8 pound gain a 50 per cent. chance. It would appear, therefore, that it is the sudden abnormal increase in weight rather than the gradual gain which is of importance in detecting an incipient toxaemia. Another fact which should be mentioned is that all cases which show this sudden gain do not develop toxaemia, but almost all cases of toxaemia (98 per cent. in this series) will have shown an abnormal increase at some time before the appearance of albuminuria.

It has been shown that this abnormal gain is as a rule an earlier sign than a raised blood pressure, but that occasionally the latter is the first indication. Therefore ideal ante-natal supervision should include the taking of the weight and blood pressure each month during the second trimester, with more frequent observations during the last trimester. If this is carried out almost all the toxaemias of pregnancy (97 per cent. in this investigation) would be diagnosed before albuminuria appeared. Treatment could then be given and the percentage of the maternal mortality due to the toxaemias of pregnancy should be materially reduced.

The majority of the toxaemias (82 per cent. in this series) would, in the present state of our knowledge, be diagnosed at the earliest possible time if the weight only was taken regularly. This is quite a simple procedure which the patient can perform herself, provided that similar clothes are worn and the same reliable scales are used on each occasion. If an increase of more than 5 pounds occurs she should have had instructions to report to the doctor. In this way a certain number of the toxaemic cases may be avoided; if not avoided, with appropriate and early treatment most of the cases would be less severe. Appropriate treatment infers that the patient should be seen frequently in order that the blood pressure be estimated, other signs and symptoms of toxaemia looked for, and a diet given until the abnormal increase in weight has been reduced. An important dietetic measure appears to be the elimination of salt; in a few cases this alone was sufficient to reduce the weight.

Conclusions

1. The average increase in weight during pregnancy is 16 to 18 pounds, and the monthly gain during the second and third trimesters is normally between 2 and 4 pounds.

2. An increase of 5 pounds or more per month is suggestive of an impending toxaemia, the probability of its occurrence varying directly with the amount of the sudden increase.

3. Every patient should weigh regularly throughout pregnancy, and be instructed to consult her doctor if the monthly gain is 5 pounds or more.

Summary

1. The variations in weight of 211 patients, fifty-two of whom developed toxaemia, have been investigated and analysed.

2. The average gain of the toxaemic patients was found to be definitely more than that of the normal patients. Moreover, a sudden abnormal increase in weight was of great value in foretelling a toxaemia; 63 per cent. of the cases which gained more than 8 pounds in one month became toxaemic, whereas the incidence of toxaemia in those cases with a normal monthly gain was only 0.9 per cent.

3. If a patient gained more than 5 pounds in a particular month it did not invariably signify that a toxaemia would develop, but 98 per cent. of the toxaemic cases showed this abnormal gain.

4. This abnormal increase in weight appeared, on the average, one month before the albuminuria, and was as a rule an earlier sign than a raised blood pressure.

5. The type and duration of labour did not appear to be affected by increased weight of the mother. Loss of weight a few days before labour was noted in only 36 per cent. of the cases.

6. It was concluded that systematic weighing of patients during the ante-natal period is of definite value in foretelling, and perhaps avoiding, the toxaemias of pregnancy.

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LUPUS VULGARIS*

WITH SPECIAL REFERENCE TO ITS TREATMENT WITH THE FINSEN-LOMHOLT LAMP

BY

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Lupus vulgaris, though not a common disease, constitutes a serious social and economic disability. Sufferers from this disease are apt to be shunned by their fellow beings, while if the disease is extensive there is difficulty in obtaining employment. As a result, the patient is dependent for maintenance on the public authorities, or on his family, with possible hardship to them.

Lupus patients also suffer considerable hardship even in connexion with holidays. If the disease is at all extensive they get admission to hotels and boarding houses with difficulty, and if they take private rooms they are looked at askance, and it is made clear that they are not really welcome. Because of this these patients not infrequently prefer to remain at home. They have, therefore, not the same chance of getting their health built up, and so the disease tends to spread more rapidly.

Incidence

In Scotland lupus is not a common disease. I am indebted to dermatological colleagues in other towns for furnishing me with statistics relating to the incidence of lupus as they see it in their clinics. In Glasgow during the last few years the number of lupus cases has varied from 0.3 to 2.1 per cent. of all new cases of skin disease. In Dundee the number has been 0.4 per cent., in Aberdeen 0.78 per cent. In the Royal Infirmary of Edinburgh the incidence has varied from 0.6 to 1 per cent. in the last five years, the number of new cases of skin disease being about four thousand per annum. The incidence of lupus as seen in Edinburgh is definitely less than it was ten to fifteen years ago, when the percentage varied from 2.8 to 4. The tendency to decrease is seen in other Scottish towns also. The reason for this decrease I shall discuss later. The percentage of lupus cases seen in some clinics in England is about the same as it is in Scotland, though other clinics have about double our percentage. The disease shows the same tendency to diminish, and I have little doubt that the same causes responsible for this decrease are found in England as in Scotland.

Sex Incidence.—Lupus vulgaris is more common in females than in males, the incidence being twice to three times as great in women as in men. This greater incidence among women is not limited to this country, but is seen fairly constantly throughout the world.

Age Incidence.—Lupus usually begins in childhood or early adolescence. Cases are seen where the disease begins after middle life, but these are not common. In an analysis of 294 cases in the Royal Infirmary I found that the age period 6 to 10 years shows the greatest number—no fewer than seventy-three cases, or almost 25 per cent., occurring during that time. Before the age of 5 years forty-five cases occurred, and of these a good many began during the first year of life, several beginning about eight months and generally after some illness such as measles. The age period 10 to 15 years accounts for fifty cases. Thus we see that more than half the cases begin during the school life of the child.

* Lecture to the Border Counties Branch of the British Medical Association, November, 1936.

Sites Affected

Lupus affects the face more frequently than any other part of the body, and is commonly found in the region of the nose. In an analysis of 310 cases I found that the face was affected in 238, or 77 per cent. As a rule lupus is not manifest on many parts of the body at the same time, but some cases show evidence of widespread disease. One patient, for example, had it on the buttocks, thigh, knee, feet, wrists, and elbows. Another had as many as fifteen patches of different sizes on his body. These multiple patches generally follow measles or chicken-pox, chiefly the former, and represent a blood-stream infection.

In addition to the skin the mucous membranes may be involved—in the nose, lips, gums, mouth, or pharynx. No patient with lupus in the neighbourhood of the nose should be allowed to go without examination of the mucous membrane. In many cases the mucous membrane is the starting-place of the disease, which spreads through to the skin. In some cases, however, the skin of the nose is involved without apparent affection of the mucous membrane.

Tuberculous Glands and Lupus

The relation between tuberculous glands and lupus must be stressed. In an examination of 270 to 280 cases of lupus I found that almost 50 per cent. followed cervical adenitis. These are minimum figures, because in many cases the site of the lupus made it certain that cervical glands had preceded the skin disease. As no definite mention was made on the patient's record card, however, these cases are not included in the 50 per cent. Van Vonno of Holland, in an examination of about the same number of cases, found scars of submental or cervical adenitis in 71.9 per cent. of his lupus cases.

During the last six years I have treated 116 cases of tuberculous adenitis in my light department at the Royal Infirmary. These cases have been sent by surgeons for treatment of the glands. Of these cases, thirty-three had discharging sinuses when sent for light treatment. Had these patients not been given general light baths I am convinced that most, if not all, of them would have had definite tuberculosis of the skin before the sinus ceased to discharge. In addition to these cases, some patients already had involvement of the skin when sent for light treatment, but they were referred for the gland condition and not for treatment of the skin disease. If the curative effect of ultra-violet ratiations in tuberculous adenitis were more widely recognized a great step forward in the fight against tuberculosis of the skin would be achieved.

Lupus vulgaris is an extremely chronic disease, progressing insidiously from month to month. Occasionally it disappears spontaneously, sometimes it develops rapidly, but at other times it appears to remain stationary. It is a pity that the disease is not painful, as the want of discomfort causes the patient to neglect it and not to seek advice when that would be of most value. The intractable nature of the disease leads to an accumulation of patients, and so the number of cases attending the clinics grows steadily larger. In some ways it is an advantage to have some extensive cases attending at the same time as the early ones. I point out to those with a small patch what they will become like if they do not attend regularly for treatment, and I also show a patient who has improved greatly as the result of steady treatment. In this way new patients can be induced to attend more regularly than they might otherwise do.

The healing of the disease leads to scar formation, and while the cosmetic result is in some cases excellent in others the scar is unsightly. The contraction of the scar not infrequently leads to considerable deformity when the disease is in the neighbourhood of the natural orifices. Ectropion is seen when the eyelid is involved. On the nose the disease may lead to narrowing of the nostrils, while the tip of the nose may become thin and pointed. In other cases the nostrils may become distended, while at the mouth there may be distortion, or the orifice may be inconveniently narrowed. When the lupus is situated in the neighbourhood of a joint the resulting contraction of the scar may lead to great restriction of movement. One end-result of the contraction of the scar I have not seen mentioned so far as I can recollect. When the lupus is situated in front of the neck the scar tends to break down as the result of the constant movement of the head. The continued movement prevents the wound healing, and the constant irritation of the parts leads to the development of carcinoma. I have seen several cases during the last few years where this seems to have been the sequence of events.

Reasons for Diminishing Incidence

I have mentioned that the incidence of lupus is diminishing. This is due chiefly, in my opinion, to the fact that in many places tuberculous glands are now being treated by means of general light baths instead of surgically.

I have already indicated the considerable percentage of gland cases with sinuses which I have been asked by surgeons to treat during the past few years at the Royal Infirmary, and I had the same experience in my light department at Leith Hospital. This experience is not merely my own. It is quite a common one among those who are accustomed to light treatment—sanatorium medical officers, for example. Some years ago Dr. John Comrie read a paper before the Medico-Chirurgical Society of Edinburgh on "The Medical Treatment of Surgical Tuberculosis." He gave his experience at Rollier's clinic at Leysin, and showed photographs of patients with sinuses and involvement of the skin where the skin infection and the gland mass had cleared up under light treatment. If a gland mass will clear up when there is a sinus, it will surely do so before a sinus has formed. The large mass of glands with periadenitis, where the glands are matted together and adherent to the deeper tissues, is the type of case leading to sinus formation. This is exactly the type of case so suitable for ultra-violet irradiation, and as more and more of these cases are irradiated we shall see fewer cases of the scrofulodermia type of tuberculosis of the skin. This applies also to those cases of bone and joint tuberculosis which so often advance in spite of all ordinary surgical measures and form abscesses. Incidentally it may be said that the amount of movement obtained in these joint cases as the result of radiation treatment is far in excess of that obtained by surgical measures. Subsidiary causes for the diminished incidence of lupus are the larger amount of fruit and vegetables now eaten and the clearing away of slums, while the medical inspection of school children also has its bearing.

General Treatment

General treatment includes all those hygienic and dietetic measures which apply to the treatment of all forms of tuberculosis. The Gerson diet has its advocates and its opponents, but it is hardly a feasible proposition for a working-class household—the class in which most cases of lupus are found. Even the advice that patients take plenty of good nourishing food is hardly possible in many

cases in these days of economic stress. But where possible a diet rich in vitamins, in addition to the ordinary diet, will help, especially in debilitated patients. In the Finsen Institute this supplementary diet consists of vitamin A (50 grammes of butter and two carrots), vitamins B and E (two tablespoonfuls of wheat germ), and vitamin C (the juice of a lemon), and it was found that these patients put on almost twice the amount of weight put on by the patients on ordinary diet.

Another important form of general treatment is general ultra-violet irradiations. Finsen was the first to observe the excellent effect that sun baths had in surgical tuberculosis. He died before he could complete his work on this subject, and it was left to others to carry out his ideas. For lupus, general ultra-violet irradiations are excellent, and in favourable cases complete cure can be brought about by treatment with carbon arc light baths alone. Such treatment should be given to all cases.

Tuberculin is a valuable remedy, and, in the absence of facilities for light treatment, would be my remedy of choice in an extensive case of lupus. Some three years ago, in a discussion at the Royal Society of Medicine, the statement was made that no thorough investigation of Koch's work had been made in this country. This was surprising to us in Edinburgh, for Sir Norman Walker began to use tuberculin in 1907, and its use in one or other form was continued till 1926, when the lack of assistance in the department prevented this work being carried on.

Local Treatment

Local treatment is looked upon as more important by many people and the remedies employed are legion. The very number suggests the inadequacy of most. I will mention only a few.

Excision, while theoretically good, is of little value. If the lupus patch is small and on a covered part the result may be excellent, but recurrence is not uncommon. On the face the method is hardly practicable. All the tissues above the muscles must be removed so as to get rid of the skin glands which extend into the subcutaneous tissues. As these are diseased the lupus spreads from the glands to the overlying skin if they are left. This applies whether the skin covering the glands and hair follicles is the adjacent skin pulled over after the excision of the patch or a graft.

Scraping, so freely indulged in by surgeons of a previous generation, will of itself never cure lupus.

Caustics may be employed with benefit, but these may prove a disadvantage in a patient who is later to receive the most modern form of treatment. Trichloracetic acid and acid nitrate of mercury are my favourites, and I have seen excellent results from their use.

X rays I mention only to condemn. I admit that they give a good transitory effect, but isolated nodules are often left in the scar and give rise to trouble later. The disfiguring appearance of the *x*-ray scar, with its telangiectasis and its parchment-like atrophied skin, is well known, but the great danger of *x*-ray treatment is the frequency with which carcinoma follows the treatment. I have seen two waves of *x*-ray carcinoma. I never want to see a third. Lomholt states that of the cases of carcinoma on lupus which he had seen all but one had had *x*-ray treatment.

Concentrated arc light treatment is undoubtedly the best local treatment for lupus. Kromayer mercury vapour lamps have been and are still used, but the results cannot compare with those from concentrated arc light treatment, only 29 per cent. of cures being recorded with the Kromayer as against 90 per cent. with the arc, and this arc being the older model with which Finsen's name is associated. This percentage of cures with the arc will, I am convinced, be increased with the most recent form of lamp, and the cosmetic results leave nothing to be desired in most cases.

Finsen Light Treatment

Finsen revolutionized the outlook for sufferers from lupus when he began the work with which his name is associated. He first used the sun as his source of energy, but found this somewhat inconstant, and he then devised the lamp which bears his name. The results obtained with this apparatus in the treatment of lupus were finer than anything ever achieved before, but there were certain disadvantages. If the arc were too high or too low a greater or less proportion of rays failed to be collected by the lenses, and so the best results were not obtained. Another disadvantage was that the applicator had to be held on the part. As the application was for two hours this imposed a considerable strain on the nurse and the patient. While Finsen's name is associated with the local treatment of lupus, it ought not to be forgotten that he was the first to suggest light baths.

Various modifications of Finsen's apparatus were made to try to overcome its disadvantages, but they were not successful till Lomholt's modification came into being. Here the lamp, the concentration or lens system, and the compression system are in one. The carbons are set at an angle instead of being one above the other as in the Finsen apparatus. The axis of the positive carbon corresponds to the axis of the concentration system, and, while burning, the carbon is automatically moved forward in this axis. The lenses instead of being made of natural brittle quartz are made of fused silica. Fused silica has a coefficient of expansion of 0.00000054, and it is this low coefficient which enables it to withstand sudden changes of temperature. It is this property of fused silica which has been made use of in the Lomholt lamp. The arc can be placed much nearer the lens, and actually it is less than two inches from the posterior surface as against four inches with the Finsen apparatus. This means at least four times the energy or intensity of radiation passing into the lens system. The lens system is a complex but very efficient one. Almost 70 per cent. of ultra-violet energy passes out, whereas the energy with the old apparatus did not amount to more than about 15 per cent. of the total radiation energy.

This energy passes through the actual compressor, which is applied to the diseased part to be treated. The compressor is hollow, and cold water circulates through it. By an ingenious arrangement the weight of the apparatus is utilized to keep the applicator firmly pressed on the part, and so, instead of one nurse to each patient as with the Finsen apparatus, one nurse can look after two or three lamps. With the increased amount of ultra-violet rays passing through, the time required for treatment is reduced to one hour. This means a great saving for the patients and staff. The results obtained with this apparatus are better than from any other form of treatment, and in many cases are literally amazing.

Permanence of Results of Light Treatment

It may be asked, "Are the results permanent? The lamp is of too recent installation to enable me to speak dogmatically on that point, but fortunately other evidence is available which will help us to judge. In 1930 Reyn of the Finsen Institute read a paper at the Eighth International Dermatological Congress in which he discussed

the results of treatment of lupus at the Institute. He took the period 1914–23. This ten-year period was chosen because the method employed in the treatment was the use of light baths as well as local Finsen treatment, and I may say in passing that Lomholt emphasizes the need for general irradiations in addition to the local treatment. Another reason for Reyn's choice was that sufficient time had elapsed since treatment was stopped to allow a true evaluation of the method to be made. During the ten years 957 cases of lupus were treated. Of these, 735 were apparently cured, 75 were still under treatment, and 147 had not gone through with the treatment to the end. If these latter are omitted, there are 810 cases, and of these 735, or 90.7 per cent., were cured when discharged. Reyn, however, was not content with these figures. He acknowledged that some may have had recurrences, and so he gave these also. In some cases the patient was too far away from the Institute to report personally, and he estimated them at fifty. He deducted these, stating that for statistical purposes they ought to be omitted. That brings his number of cases of whom he had authentic information down to 685 cured, a percentage of 90.1. Of the total number of cases cured there were thirty-two in whom recurrences took place, and further treatment cured these. In addition, there were twelve in whom the disease appeared in a new locality, and these were cured by subsequent treatment. That means that out of 735 patients who were treated to the end, forty-four showed signs of disease later.

These figures give some idea of the value of the treatment by means of general light baths and concentrated arc light applied locally, and no other treatment known will show results comparable to them. There is every reason to believe that the new lamp will give results every bit as satisfactory as those obtained with the old lamp, and in a much shorter time. The fact that at the Finsen Institute all the Finsen lamps have been discarded, except one used as an exhibit, and Finsen-Lomholt lamps installed in their place, will serve to show what is thought of the new lamps by those in the best position to judge. Under these circumstances it is hardly too much to say that Dr. Lomholt has completely altered the outlook of sufferers from this disease and has opened out a new vision of life for them. Surely it is incumbent on those of us who can help them to do everything in our power to see that they get the chance of happiness instead of the misery which has hitherto been their lot.

[Dr. Aitken quoted a number of cases treated with the three Finsen-Lomholt lamps in his department, and showed a number of lantern slides in natural colour demonstrating the striking change brought about by the treatment.]

For the forthcoming meeting of the International Surgical Congress, to be held in Vienna in 1938, the following subjects have been chosen. Arrangements are now being made with regard to speakers. Any member of the society who would like to take part is asked to communicate with Professor Grey Turner, British Post-Graduate Medical School, Ducane Road, London, W.12. *Surgical treatment of arterial hypertension*: (1) The physiopathological problem from the surgical point of view; (2) intervention and its results: (*a*) paroxysmal hypertension, (*b*) solitary hypertension. *Bone grafts*: (1) Biological studies, with report on the comparative value of various procedures; (2) bone graft in new traumatisms and in pseudo-arthroses; (3) in osseous tuberculosis and articular tuberculosis; (4) in the osseous dystrophies and tumours (cysts, osteosarcomas); (5) in chronic arthritis. *Surgical treatment of cysts and pulmonary tumours*: (1) Physiological conditions of pulmonary surgery; (2) methods and procedures; (3) results.

BLOOD GROUP TESTS IN DISPUTED PATERNITY

BY

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The existence of individual differences between the bloods of normal persons is well known. The four classical blood groups were described by Landsteiner and his pupils during the early years of the present century. The more recently discovered M and N blood factors, taken in conjunction with the older groups, define twelve different blood types. These blood types are determined solely by heredity, and their inheritance is carried out in an orderly manner in accordance with certain well-established laws. Accordingly, blood group tests can be applied in medico-legal problems involving questions of blood relationship, particularly in cases of false accusations of paternity.

The Agglutinogens A and B

The four Landsteiner blood groups, now designated AB, A, B, and O,* are characterized by different combinations of two agglutinable factors (agglutinogens) A and B in the red blood cells, and two agglutinins α (anti-A) and β (anti-B) in the serum:

Group	Agglutinogens in the Red Blood Cells		Agglutinins in the Serum		Group	Agglutinogens in the Red Blood Cells		Agglutinins in the Serum	
AB	A	B	—	—	B	—	B	α	—
A	A	—	—	β	O	—	—	α	β

The agglutinogens A and B are inherited characters which behave as simple Mendelian dominants. The factors controlling their inheritance and development are called genes, and are localized in the chromosomes in the nuclei of the body cells. These genes occur in pairs in corresponding sites on a pair of chromosomes, there being twenty-four pairs of chromosomes in each body cell. In the formation of the male and female germ cells, however, the pairs of chromosomes separate so that each mature germ cell contains only one half-set of chromosomes, and consequently one half-set of genes.

The union of male and female germ cells results in the formation of a new individual whose cells contain the full complement of chromosomes (and therefore of genes), one-half from each parent. The blood groups are determined by the presence of a gene for A, or B, or their absence O, in each of one pair of chromosomes in each body cell.

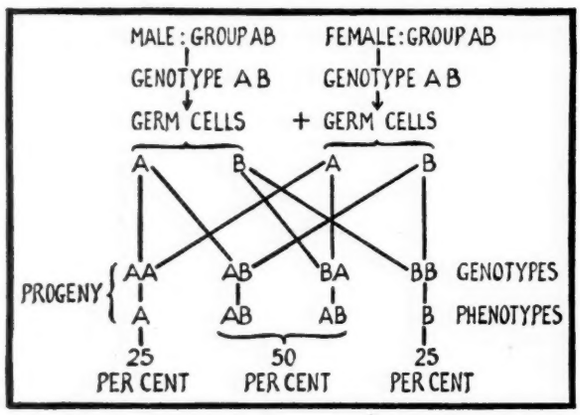
There are then six possible genetic formulae or genotypes—AB, AA, AO, BB, BO, and OO. There are two kinds of group A and group B individuals, genetically speaking, depending on whether the genes for A and B are carried by both chromosomes (AA and BB) or by one only (AO and BO). The former are termed homozygous and the latter heterozygous. From the serological aspect, however, the bloods of individuals of genotypes

* International nomenclature; Moss groups I, II, III, and IV correspond to AB, A, B, and O respectively.

AA and AO are indistinguishable by direct laboratory tests, so that we have only four actual blood groups or phenotypes. The reason for this is that blood of group A will be produced equally well in an individual whether he has one or two genes for A in his chromosomes AO or AA.

Genotype	Phenotype (Group)	Genotype	Phenotype (Group)
AB	AB	BB BO	B
AA AO	A	OO	O

Bearing in mind that when the male and female germ cells unite to form a new individual the cells of the latter contain one half-set of chromosomes, and therefore of genes, from each parent, we can forecast the manner in which the blood groups will be inherited. Thus a male of group AB will produce germ cells half of which will carry the gene for A and half the gene for B; similarly a female of the same group will produce germ cells containing A or B. The offspring of these two parents may be of genotype AA, BB, or AB, depending on which of the possible combinations of the parent genes takes place. This is governed solely by chance, so that if we take a number of matings of AB with AB we would expect the offspring to be 25 per cent. group A, 25 per cent. group B, and 50 per cent. group AB (see figure).



Reasoning in a like manner, matings of AB with O parents would be expected to produce on the average 50 per cent. of group A and 50 per cent. of group B progeny. When we come to parents of group A we must allow for the two genetic forms AA and AO; the former gives rise to germ cells all containing the gene for A, while the latter produces cells half of which contain the gene for A and half that for O. Similarly with group B individuals. For example, the mating of a heterozygous A (genotype AO) with a heterozygous B (genotype BO) can give rise to progeny of genotypes AB, AO, BO, and OO—that is, to children of all four groups.

The foregoing facts concerning the mechanism of inheritance of the agglutinogens A and B can be resolved into two laws:

1. The agglutinogens A and B cannot appear in the blood of a child unless present in the blood of one or both parents.

2. A group O parent cannot have a group AB child and an AB parent cannot have an O child.

The following list gives the children possible and children impossible from the matings of the various groups:

Parents	Children Possible	Children Impossible	Parents	Children Possible	Children Impossible
AB × AB	AB, A, B	O	A × B	AB, A, B, O	—
AB × A	AB, A, B	O	A × O	A, O	AB, B
AB × B	AB, A, B	O	B × B	B, O	AB, A
AB × O	A, B	AB, O	B × O	B, O	AB, A
A × A	A, O	AB, B	O × O	O	AB, A, B

The Agglutinogens M and N

In 1928 Landsteiner and Levine described in human blood corpuscles two new agglutinogens M and N, which define three types of blood—namely, type M, type N, and type MN. These agglutinogens, demonstrated by means of immune rabbit sera, were found to occur independently of the agglutinogens A and B. The agglutinogens M and N were shown to be inherited as Mendelian dominants, dependent on a single pair of genes M and N, there being only three possible genotypes MM, NN, and MN, corresponding to the three phenotypes M, N, and MN. In no instance has a blood been found to lack both M and N agglutinogens. The mechanism of the inheritance of the M and N types is as follows:

Parents	Children Possible	Children Impossible	Parents	Children Possible	Children Impossible
M × M	M	MN, N	MN × MN	M, MN, N	—
M × MN	M, MN	N	MN × N	MN, N	M
M × N	MN	M, N	N × N	N	MN, M

This resolves into two laws:

1. The agglutinogens M and N cannot appear in the blood of a child unless present in the blood of one or both parents.

2. A type M parent cannot have a type N child and an N parent cannot have an M child.

These theories of the inheritance of the agglutinogens A, B, M, and N have been amply confirmed by the study of their distribution in large numbers of families in various countries and by statistical tests concerning their incidence in numerous populations.

Establishing Non-paternity

Since the agglutinogens A, B, M, and N are inherited in accordance with the above laws, blood group tests are applicable to medico-legal problems concerning disputed blood relationship, of which the commonest is false accusation of paternity. Let us take an example. A woman accuses a certain man of being the father of her illegitimate child and the paternity is denied. The blood groups of the child, mother, and man are found to be A, O, and O, respectively. The child thus possesses the agglutinogen A, not present in the blood of the mother, so that the true father must have belonged to group AB or A. As this agglutinogen is not present in the blood of the accused man his non-paternity is established. Assume however, that the accused man had been of group A. All that could be said in that case would be that he might be the father, not that he is the father, since any other man of either group A or AB might be the true father. Having thus failed to reach a definite decision with the A and B tests, the M and N types of the man, woman, and child can be determined. If these show an impossible combination the man is exonerated.

It will be readily apparent, then, that blood group tests may offer conclusive evidence that a certain man could not be the father of a particular child, but can *never* prove that he *is* the father. The only possible exception to this is where it can be established that one of two men must be the father. Wiener cites an interesting example of such a case. A woman wished to know whether her husband or her lover was the father of her child. Tests showed that husband, lover, and child were all of group A, so that no decision could be given by the A and B tests. On determining the M and N types it was found that the mother, child, and husband were of type M, while the lover was of type N, thus proving that the lover could not be the father. It was established, therefore, that the husband was the father of the child.

It is of interest to compute the chances, if we determine the groups of the mother, child, and accused man, of finding one of the impossible combinations and thus proving the man's non-paternity. This chance varies with the group of the accused and is influenced by the incidence of his group in the general population.

Probabilities of Establishing Non-paternity with the A and B Tests. (After Wiener.)

Group of Falsely Accused Man	Probability (Approximately)
AB	2/5
A	1/13
B	1/7
O	1/4
Unknown	1/6

Probabilities of Establishing Non-paternity with the M and N Tests. (After Wiener.)

Type of Falsely Accused Man	Probability (Approximately)
M	1/3
N	2/5
MN	0
Unknown	1/6

The new M and N tests have doubled the chances of proving non-paternity, and in conjunction with the A and B tests afford expectation of evidence of non-paternity in one case in three on the average. The probability is highest (2/3) in accused men of type ABN and lowest (1/13) in type AMN. Lauer, cited by Wiener, reports that since the discovery of the M and N factors many old cases have been reopened in Germany by men who were supporting children under a decree of court because the tests for A and B did not exclude them, in the hope that the M and N tests might establish their innocence.

Other problems in which blood group tests may be of value include false maternity and the interchange of infants.

Practical Application

An examination of the literature reveals that the foregoing theories of the inheritance of the agglutinogen substances of the human blood corpuscles have been amply confirmed by the study of the blood groups in large numbers of families by many independent investigators throughout the world. As these records grew it became apparent that blood group tests might be applied to cases of disputed paternity. Though the chances of success were limited when only the older Landsteiner group tests were available it will be seen below that a considerable use was made of the tests on the Continent. After 1928, when the M and N blood types were discovered, the value of blood tests was enhanced owing to the greater chance of coming to a definite decision, and perhaps in a few years we may have X and Y types to enhance still further the value of the tests. The legal history of the tests is as follows:

1910: Von Dungern and Hirszfeld indicated the possible value of blood group tests in disputed paternity cases.

1924: The evidence of blood tests was first employed in the German courts.

1929: Up to this time the tests had been used in over 5,000 cases of disputed paternity in Europe alone.

To-day, although accurate figures are not available, the number of times the tests have been employed must be of the order of tens of thousands, for they are in use in Austria, Belgium, Czechoslovakia, Denmark, Italy, Japan, Lithuania, Norway, Sweden, Switzerland, and have been used in the Irish Free State. In the United States of America the tests are employed, more particularly in the States of New York and Wisconsin, and it is believed that steps have been taken in these States in connexion with special legislation to make the tests more readily available.

In this country it has to be put on record that except for one or two isolated occasions no use has been made of the blood group tests, and it may be of moment to examine the reasons for this.

The first is that most litigants and even lawyers are unaware of the test and its possibilities. The second is perhaps a certain distrust of scientific method among the lay magistrates, a conservatism which is to a large extent part of the national character. This attitude is an admirable one to adopt when dealing with any new test that has not been established beyond all reasonable doubt, but the blood group test has gone far beyond the experimental stage and its reliability is fully established. Thirdly, owing to a misunderstanding which appears to exist in some legal minds, it is suggested that a failure of the test to make a decision of non-paternity available may create an impression in the minds of those who have to make the final decision that the accused man is in fact the father. When the rationale of the test is better understood such an argument will be found to be without foundation. Fourthly, the use of the test in these cases must always be demanded by the alleged father, as it is he who sets out to prove his innocence and it is he only who can benefit by it. Even if the accused man knew of the tests and desired to submit to them, the court would have no power to compel the woman applying for the affiliation order to submit to the examination and might not be justified in drawing any inference from her refusal. Fifthly, at the present time the test is somewhat costly and beyond the pockets of the poorer class of defendants, but this would soon be remedied if sufficient cases were forthcoming.

While we do not pretend to have any legal knowledge and are subject to correction on this point, we believe that an essential difference in the legal practice largely accounts for the extensive use of the test in other countries. Power, we understand, is given in many countries in Europe to the court to order the performance of the tests—that is, scientific evidence is in general obtained at the instruction of the court so that no onus in this respect is placed on the litigants. This practice has many points in its favour, as the scientific witness is a court witness and is not a party witness. It is believed that the new legislation in America is designed to meet this difficulty so that the court may be in possession of this evidence.

Conclusion

In conclusion, attention may perhaps be called to the fact that cases of this type, unfortunately common before courts of summary jurisdiction and occasionally featuring elsewhere—for example, the Russell case—are amongst the most difficult in which magistrates have to exercise their judicial powers, and tragic miscarriages of justice are not unknown. In the recent report of the Departmental Committee on *Imprisonment by Courts of Sum-*

mary Jurisdiction in Default of Payment of Fines and other Sums of Money (July, 1934), an opinion was expressed that in some instances men, although able to pay, preferred to go to prison rather than pay for the upkeep of a child which they believed was not theirs; one case is cited (p. 57) in which:

"the defendant, who denied not only that he was the father of the child but that he had ever had intercourse with the complainant, had been committed to prison for non-payment no fewer than fifteen times in about two years, although he was well able to pay. He finally collected evidence upon which the mother of the child was convicted of perjury in the original proceedings. As a result the Court of Summary Jurisdiction refused to enforce the order for weekly payments. The adjudication of paternity, however, still remains."

The hearing of these cases often takes up much of the time of our courts, and the patience shown by the justices in their attempts to arrive at the truth is well known. In some instances they would be spared all the hearing of the case if blood group tests were employed, for an immediate decision could be taken after the hearing of the scientific evidence and without recourse to any other evidence. The saving in time and money which the tests would ensure is quite sufficient to counterbalance their cost or the cost of maintaining centres where they could be carried out. It is needless to compare the thoroughly proven reliability of the evidence of scientific blood tests with the notoriously unreliable "evidence" often advanced—for example, resemblance between the accused man and the child.

It would therefore seem desirable from every point of view that the fullest encouragement should be given to the use of blood group tests, and that, if necessary, consideration should be given to the question of providing statutory powers to enable the tests to be made in every case where the question of paternity is at issue.

It is a pleasure to express our thanks to Mr. D. H. Kitchin, barrister-at-law, for his valuable assistance with the legal aspects of this paper.

The following medical promotions in, and appointments to the Venerable Order of the Hospital of St. John of Jerusalem were announced in the *London Gazette* of January 1: as Knights, Sir Louis Knuthsen, K.C.V.O., O.B.E., Mr. G. M. Huggins, Lieut.-Colonel A. R. Falconer, C.B.E., V.D., Dr. S. L. Dawkins, Major-General R. M. Downes, C.M.G.; as Commanders, Dr. W. D. Kirkwood, Lieut.-Colonel H. W. Webber, Dr. L. E. Ellis, Colonel J. A. H. Sherwin, V.D., Surgeon Vice-Admiral Sir Robert Hall, K.C.B., O.B.E., K.H.P., Dr. J. N. Morris; as Associate Commander, Lieut.-Colonel Sir Hassan Suhrawardy, O.B.E.,; as Officers, Dr. G. Holroyde, *M.C.*, Dr. E. Jones, Captain H. F. J. Norrie, Dr. R. V. Clayton, Lieut.-Colonel L. H. Leeson, Lieut.-Colonel W. Vickers, D.S.O., V.D., Colonel H. H. E. Russell, O.B.E., Dr. H. Smith, Captain R. Marshall, Dr. C. G. Moore, C.V.O., Dr. A. G. J. MacIlwaine, C.I.E., Dr. I. W. MacGregor, Dr. R. W. M. Strain, Lieut.-Colonel J. S. Matheson, Dr. W. W. White, Dr. G. R. Johnson, Lieut.-Colonel D. A. Whitton, O.B.E., Colonel S. R. Burston, C.B.E., D.S.O., V.D., Colonel W. W. S. Johnston, D.S.O., *M.C.*, Colonel H. C. Disher, Dr. F. E. McAree, Lieut.-Colonel J. R. Donaldson, Dr. Margaret E. Douglass; as Associate Officer, Dr. Ardaviraf Dinshawji Edal-Behram; as Serving Brothers, Dr. R. Y. Stones, *M.C.*, Dr. J. P. Mitchell, O.B.E., Dr. R. D. Brinton, Dr. J. B. Aitken, Dr. W. Verner, Dr. C. E. L. Burman, Dr. A. E. Pinniger, Captain W. A. Rees, Dr. S. E. Dunkin, Captain R. I. Poston, Dr. D. Malloch, *M.C.*, Mr. A. Croll, Dr. E. A. H. Russell, O.B.E., V.D., Dr. G. Simpson, Dr. J. J. Hurley, Dr. C. W. Gale, Dr. J. E. Piper, Dr. F. M. Read, Dr. J. S. Davies; as Serving Sister, Dr. Mary A. S. Ham.

SOME CLINICAL ASPECTS OF THE LYMPHATIC SYSTEM

BY

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The repeated discussions during the last few years as to the respective merits of surgical operation and radium therapy in carcinoma of various organs call for a brief analysis of our topographical knowledge of the lymphatic system. The need is all the greater now that various schemes are under discussion for the establishment of accurate registers of the occurrence, spread, and degree of lymphatic involvement in cases of cancer. The questionaries which have been circulated from time to time are almost valueless as regards the sections dealing with the involvement of the lymphatic glands. Most of the illustrations of the lymphatic vessels and lymphatic glands in the standard textbooks of anatomy are variants of the beautiful plates in Mascagni's famous atlas, which was published in 1787. Successive anatomists and artists, often with more imagination than accuracy, continue to depict in green various lymphatic vessels and glands in relation to veins coloured blue. A careful reading of William Hewson's researches in the Windmill Street School from 1768 to 1774, together with a study of Mascagni's plates, will convince the reader of the conservatism which exists in this field. It is not surprising, therefore, that the collective reports of lymphatic involvement both at operation and at necropsy defy analysis.

Certain important contributions have been made to the history of the development of the lymphatic vessels by Sabin (1901), Huntington and McClure (1910), and Kampmeier (1928). Lymphatic vessels are now regarded as modified veins lined by an endothelium which is derived from and is continuous with that of the veins. In early life lymph vessels invade the embryonic tissues in the same way as the arteries and the veins. The lymphatic invasion is incomplete since the lymph vessels never reach the spleen, the epithelium proper, the sclerotic of the eyeball, uncalcified cartilage, the depths of the central nervous system, the bone marrow, and the foetal part of the placenta. Whereas most lymphatic vessels eventually lead to the thoracic duct or the small right thoracic duct, there are several organs in the body, notably the thyroid gland, in which the lymphatics open directly into the neighbouring veins. The classical discussion whether all the lymphatic vessels arise centrifugally from the jugular lymphatic sinuses or whether some of them arise in the mesoderm and develop centrifugally from tissue spaces to the jugular lymph sacs is immaterial. Kampmeier (1928) has shown that the thoracic duct and the main conduits of the lymphatic system acquire a system of valves at an early date in the life of the embryo. The human embryo aged 3½ months already presents forty-two valves in the thoracic duct, but most of the valves in the venous system are formed after this date.

Histological Structure and Disposition

The fundamental facts about lymphatic vessels are indicated by their histological structure and disposition. Lymphatic vessels are rich in yellow elastic tissue and in valves but poor in muscle. They are situated near the main arteries of the area so that the pulsation of the artery, transmitted to the neighbouring lymphatic vessel, is mainly responsible for the propagation of the lymph in the direction determined by the valves. For this reason the thoracic duct in its ascent from the cisterna chyli in the abdomen to the thorax lies in proximity to the

abdominal and thoracic aorta. It crosses from right to left in its attempt to hug the left-sided aortic arch, and so reaches the region of the subclavian artery and vein on the one hand and the left common carotid and internal jugular vein on the other. The right lymphatic duct bears a corresponding relation to the innominate artery on the right.

In the early embryo the lymph drainage consists of paired lymph trunks on either side of the aorta with numerous anastomoses across the middle line—a pattern which also holds for the veins of the area. The suppression of the right aortic arch and the persistence of the left result in the formation of the adult duct from the distal portion of the right and the proximal portion of the left embryonic ducts, the cross anastomosis being situated at about the fifth dorsal vertebra in common with one or more anastomoses of the azygos venous system.

Lymphatics of the Upper Limb

If the upper limb is placed in the embryonic position with the thumb directed cranially and the little finger caudally, the preaxial border of the limb is delineated by the cephalic vein and the postaxial border by the basilic vein. In the embryo there is a well-marked arterial anastomosis along both borders. The postaxial persists as the axillary, brachial, and ulnar arteries; the persisting parts of the preaxial anastomosis are found in the distal two-thirds of the radial artery and in the humeral branch of the thoraco-acromial artery in the groove between the biceps and the deltoid.

The change in arterial pattern of the limb has led to corresponding changes in the lymphatic drainage. The main lymphatic drainage in the adult is now concentrated along the postaxial border of the limb with a few lymphatic glands near the medial condyle of the elbow and numerous glands in the axilla. The lymphatic drainage along the preaxial border of the limb has been considerably reduced, and the only lymphatic gland or group of glands is that found in the delto-pectoral triangle below the clavicle where the costo-coracoid membrane is pierced by the branches of the thoraco-acromial artery and by the cephalic vein. Thus the frequency of involvement of the axillary glands, as compared with the delto-pectoral glands, results from the change in pattern of the lymphatic drainage due to the change in the arterial pattern. In short, the lymphatic vessels tend to hug the pulsating arteries of the postaxial border.

Lymphatics of the Lower Limb

In the lower limb the preaxial border is delineated by the great saphenous vein from the great toe to the groin—the postaxial border in its distal part by the short saphenous vein, and in its proximal part by a line from the head of the fibula across the outer side and back of the thigh to the coccyx. In the early embryo there is a well-marked arterial anastomosis along the preaxial border of the limb. This persists in practically all mammals, including all the primates except man, as the arteria saphena which accompanies the saphenous vein in the whole of its extent and the saphenous nerve in its distal half. Along the postaxial border of the limb of the embryo there is an arterial anastomosis which has disappeared in adult man except for the proximal portion represented by the anastomosis of branches of the inferior gluteal artery with posterior sacral branches of the lateral sacral arteries, and distally by the anastomosis of the peroneal artery in relation to the external malleolus.

In most of the lower animals the short saphenous vein does not enter the popliteal vein at the back of the knee, but ascends to a higher level along a path which is marked out by the posterior cutaneous (small sciatic) nerve of the thigh. In man the short saphenous vein frequently makes but a small communication with the popliteal vein, and continues its course along the back of the thigh in company with the posterior cutaneous nerve to a point about three to four inches below the fold of the nates; it then runs medially across the inner aspect of the thigh to join the great saphenous vein. Thus the lower limb in the adult presents a lymphatic drainage which is concentrated almost entirely along the preaxial border to reach the glands of the groin.

Textbooks indicate a rich lymphatic drainage along the postaxial border of the limb. This is virtually non-existent, since infections of the third, fourth, and fifth toes or the interdigital clefts, as in epidermophytosis, result in painful enlargement of the glands of the groin. The popliteal glands are small, and are never involved except in the case of an infection of the skin at the back of the heel. All the rest of the limb drains into the groin.

The lower limb is thus burdened with a system of lymphatic vessels which are no longer related to actively pulsating arteries of any considerable size. The arterial anastomoses along the postaxial border are almost negligible and, subsequent to the loss of the great saphenous artery, the preaxial border maintains only the anastomoses around the internal malleolus of the ankle, the diminutive saphenous branch of the anastomotica magna, or arteria genu suprema, at the knee, and the large superficial femoral artery in the groin.

The lymphatic drainage differs more from the primitive arterial pattern in the lower limb than in the upper limb. In the lower limb it is always on the verge of breaking down. Moreover, the lymphatic glands of the lower limb occur mainly in the superficial fascia in proximity to cutaneous nerves, whereas those of the upper limb lie mainly in the deep fascia. This explains the pain and urgency of infections of glands in the groin as compared with glands in the axilla.

The Lymphatics of the Female Generative Organs

The various derivatives of the intermediate cell mass (Wolffian body) of the embryo are supplied by a series of arteries which arise in turn from the abdominal aorta, the common iliacs, the umbilical arteries, the external iliacs, and the sacral arteries. In the early embryo the blood supply to the germinal ridge extends from the neighbourhood of the suprarenal gland to the position of the future internal abdominal ring at the midpoint of the groin. The ovary, proximally, maintains its supply by a direct branch from the abdominal aorta; the round ligament, distally, at the groin, like the spermatic cord in the male, maintains a supply from the deep epigastric branch of the external iliac artery. The uterus and vagina are supplied by the uterine and the vaginal arteries, which are branches of the internal iliac artery. The vaginal artery corresponds to the inferior vesical in the male, and both of these often arise in common with the middle haemorrhoidal artery. In short, these branches of the internal iliac artery supply the derivatives of the cloaca of the embryo.

The inferior haemorrhoidal and the various other branches of the internal pudendal artery to the perineum and the external genitalia are the derivatives of the embryonic artery to the proctodeum. In addition, branches of the lateral sacral arteries run with branches of the second, third, and fourth sacral nerves, the nervi erigentes, to form a number of neuro-vascular bundles

supplying the rectum, cervix, and the base of the bladder. In all the mammals with a bicornuate uterus the broad ligaments contain an anastomosis not only of the ovarian, uterine, vaginal, and lateral sacral arteries, but also of the branches of the external iliac artery in the neighbourhood of the internal abdominal ring. The latter branches, in the pregnant rabbit, cat, or dog, are as large as the uterine and ovarian arteries. In the woman these uterine branches of the external iliac arteries have been almost entirely suppressed. They persist as small branches to the round ligament of the groin, but they are significant. In the human genus also the ventral extension of the genital

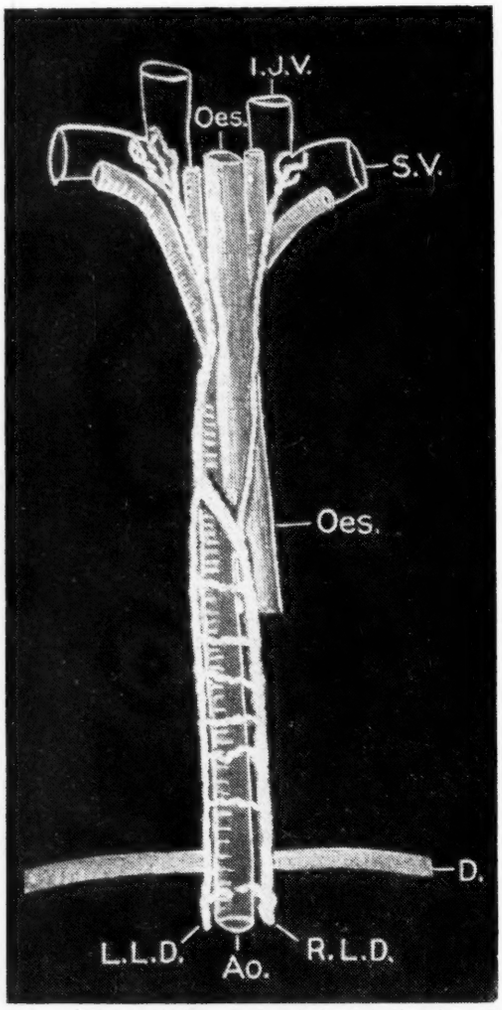

Diagram of the posterior aspect of the paired right and left lymphatic ducts in the human embryo of the third month to show the manner in which the adult thoracic duct is formed from the right duct inferiorly, one of the numerous transverse anastomoses, and the left duct superiorly in accord with the left-sided aortic arch. The superior portion of the right side persists as the right lymphatic duct of the adult. Abbreviations: Oes. = Oesophagus. I.J.V. = Internal jugular vein. S.V. = Subclavian vein. D. = Diaphragm. Ao. = Aorta. L.L.D. = Left lymphatic duct. R.L.D. = Right lymphatic duct.

cleft accounts for the relatively large supply to the pudendum from the superficial and deep external pudendal branches of the femoral artery.

As in the case of the upper and the lower limbs, the lymphatic drainage of the female genital tract is clearly portrayed by this brief history of the mammalian arterial pattern. The glands involved in carcinoma of the cervix are essentially internal iliac, common iliac, aortic by reason of the uterine artery; aortic direct by reason of the anastomosis between the uterine and ovarian arteries; superficial and deep inguinal glands by reason of the round ligament and the large ancestral uterine branches of the external iliac arteries; internal iliac, common iliac, and aortic by reason of the internal pudendal arteries; presacral glands by reason of the lateral and middle sacral arteries; and superficial inguinal by reason of the superficial and deep external pudendal arteries from the femoral.

It is probable that an attempt at a block dissection of any of these groups of glands is doomed to failure, whether it be for carcinoma of the cervix, the ovary, or the vulva. Primary healing of the skin of the groin after a block dissection of the inguinal glands is rarely, if ever, seen. This has its counterpart in the chronic infection of the inguinal area in the male affected by buboes. The skin of the groin will stand nothing more than a linear incision if healing by primary intention is to be guaranteed.

Age Changes in the Lymphatic System

The precocious development of the lymphatic ducts and valves in the early embryo is purchased at a price. The senile degenerations of the lymphatic vessels probably precede those of the arterial and venous systems, so that the effective extent of the lymphatic vessels undergoes considerable shrinkage with age. It is not without significance that age changes in the way of degenerations, with or without calcification of the matrix, constitute a phenomenon commonly witnessed in the ligaments, arteries and meninges of the brain and spinal cord in the aged dissecting-room cadaver. The slow rate of lymphatic involvement in post-menopausal cancer of the breast or female genital tract may be a consequence of the senile shrinkage of the lymphatic vessels draining the areas.

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J. P. Bose and U. N. De (*Indian J. med. Research*, October, 1936, p. 489) have estimated by the method of Myers and Wardell the total plasma cholesterol content in one hundred normal and eighty diabetic Indians, together with the blood sugar in the diabetics. The normal plasma cholesterol values ranged from 102 to 178 mg. per 100 c.cm., 91 per cent. lying between 120 and 160, which was taken as the normal range; the mean value was 147 mg. per 100 c.cm. There was no difference between males and females. In the diabetics the plasma cholesterol ranged from 100 to 410 mg. per 100 c.cm., and bore no relation to the degree of hyperglycaemia. The cases were grouped according to their plasma cholesterol contents and observed for ten days, with treatment appropriate to their clinical needs. Twenty-four cases had a normal plasma cholesterol content, showed few complications, and responded satisfactorily to treatment. In the other groups with hypercholesterolaemia, as the range of plasma cholesterol content rose, the frequency of complications, especially arteriosclerosis, rose, and the response to treatment was less and less satisfactory. The authors conclude that the degree of cholesterolaemia in diabetes is a more satisfactory index of the severity of the disease than is any other factor, including hyperglycaemia. They discuss the relation of hypercholesterolaemia to arteriosclerosis in diabetics.

Clinical Memoranda

Crude Cod-liver Oil in Treatment of Wounds

Having read of the cod-liver oil treatment of wounds (Steel, 1935) I was encouraged to make use of a crude cod-liver oil dressing as a routine, and have come to the conclusion that it has marked healing and aseptic properties. Besides being cheap, it is applicable to all kinds of wounds. I started using it first for minor injuries and indolent chronic ulcers. In order to estimate the efficacy of this method half my cases were treated with recognized antiseptics such as acriflavine, mercurochrome, eusol, etc., while the other half were dressed with crude cod-liver oil. Not only minor injuries did well, but its application was justified in deep and extensive wounds. Satisfactory results having been obtained in the out-patient department it is being used for dressing cases after operation. The following cases illustrate the gratifying results.

CASE REPORTS

A girl aged 10 had injured her tibia as a result of a fall a year ago. She attended the hospital because she began to have pain, and a slight swelling was noticed over the tibia. An *x*-ray examination was advised, but the parents preferred the treatment of an unqualified man, who incised the swelling and had attempted to scrape the bone. The girl again attended hospital because the wound refused to heal and was very dirty, exuding foul pus in large quantities; the swelling of the bone also had extended further. In the hospital the usual operation for osteomyelitis was performed, but the wound was badly infected, and every day a large amount of pus exuded. After a fair trial with acriflavine, mercurochrome, and brilliant green without much success the wound was dressed with crude cod-liver oil. Within a fortnight it was full of healthy-looking granulations and there was very little pus. The wound completely healed in a few weeks and the patient was discharged cured.

A man was admitted for a gunshot wound of the right leg. The bullet had splintered the tibia, and some of the fragments of the bone had penetrated the calf muscles. The wound was very dirty, and to stop the bleeding the villagers had applied some substance which was mixed with road dust. After taking the necessary surgical steps we started using for dressing mercurochrome, acriflavine, and other antiseptics, but the wound would not heal, and green pus continued to discharge. After giving a fair trial to the above-mentioned antiseptics we tried crude cod-liver oil. The discharge lessened; there was none at all after the twelfth day and the wound was full of healthy granulations. Just for a trial, instead of using crude cod-liver oil, we used pure cod-liver oil. Our findings were interesting—granulations soon began to look pale and the healing slowed down considerably. On resumption of crude oil for dressing the wound again started healing and within a few weeks the patient was discharged cured.

We obtained equally good results in patients very badly burnt. A man was brought to the hospital burnt all over the body; face, abdomen, and extremities had third-degree burns. He was admitted in a collapsed condition. We started dressing straight away with the crude cod-liver oil; within a month he left the hospital, and when we saw him after two months there was neither scarring nor pigmentation of the skin.

Many other cases have given similar good results with crude cod-liver oil treatment. It seems that the crude cod-liver oil has some healing property for skin, tissues, and even bones. Crude oil seems to be better than pure cod-liver oil, and it would be interesting to know the cause of this difference. Is it that some factor in crude oil which has healing properties is removed or destroyed during the process of purification?

M. B. DAVER,
Civil Surgeon, Nizamabad.
Hyderabad, Deccan.

REFERENCE

Steel, T. P. (1935). *Lancet*, **2**, 290.

Tubercle Bacilli in the Cerebro-spinal Fluid : Recovery

The following case may be of interest. A woman, aged 31 years, was admitted to the City Mental Hospital, Portsmouth, on February 6, 1936. There was a history that for a month past she had been restless and depressed. Three days before admission she ran into the garden of her home and fell heavily, striking the back of her head. A sister of the patient stated that for some time past she had been unduly irritable and unable to concentrate, also having complained of severe headaches.

On admission she was suffering from an acute confusional psychosis. She was restless, noisy, rambling and incoherent, resistive to attention, constantly stripping off her clothes and exposing herself. Temperature was 100.2° F., pulse 95, respiration 34. Physical examination was difficult owing to her mental state. *X*-ray examination of the skull was negative.

On February 18, because of the prolonged pyrexia, headache, and irritability, alternating with periods of drowsiness, a lumbar puncture was performed under a general anaesthetic. The cerebro-spinal fluid was not under increased pressure, but was slightly turbid. The fluid was examined bacteriologically by Dr. J. A. D. Radcliffe of the Portsmouth Royal Hospital, and his report was as follows: Pus cells and tubercle bacilli present; lymphocytes were increased; culture of the fluid was sterile.

On February 24 temperature was 99° F., pulse 80. Her mental condition had improved. She was quieter and less confused, and there were no physical signs of meningitis. On February 29 a lumbar puncture was again carried out. Fluid was not under pressure; it was quite clear. The bacteriologist reported that globulin was present in excess; sugar 0.08 per cent.; there were a few pus cells and increase of lymphocytes; tubercle bacilli not present; culture sterile.

From February to June her physical condition continued to improve, but her mental condition varied from week to week. At times she was depressed, seclusive, and self-absorbed, refusing to speak or to answer questions; at other times she was bright and cheerful, and answered questions quickly, correctly and intelligently. From July 15 her mental condition began to show marked improvement. On July 24 a lumbar puncture was again performed. The report was: Fluid clear, no clot; globulin *nil*. Microscopical examination: no pus cells; tubercle bacilli not found; culture sterile.

On August 26 her physical condition was good. There were no physical signs of disease, and her weight had increased by 12 lb. She looked and felt well. Her mental condition was normal; she conversed readily and rationally, and occupied herself usefully. Up to the present her improvement has been maintained. During the day she is busy in the needle-room, and in the evenings entertains the patients, as she is a capable pianist. She is being discharged from the hospital in the near future.

I am indebted to Dr. T. Beaton, O.B.E., medical superintendent of the hospital, for permission to publish the notes of this case.

JOHN P. MCGUINNESS,
Assistant Medical Officer, Portsmouth City Mental Hospital.

Reviews

ASSESSMENT OF DISABILITY

Disability Evaluation. Principles of Treatment of Compensable Injuries. By Earl D. McBride, B.S., M.D., F.A.C.S. (Pp. 623; 374 figures. 38s. net.) Philadelphia and London: J. B. Lippincott Company. 1936.

Dr. Earl D. McBride of the University of Oklahoma asserts that "the profession is making no effort to develop a scientific basis for interpreting or appraising the end-results of injury in mathematical or monetary values. . . . As he [the doctor] has never done hard manual work he is incompetent to testify from experience as to the ability of an injured labourer to perform his duties. Furthermore, the average physician is not accustomed to be definite. In his practice he deals constantly with uncertainties." It cannot be claimed that this book provides a reliable table of figures from which the compensation value of any particular injury can at once be ascertained—indeed, by the nature of the human material no such precision is possible; one cannot assess the earning capacity of a man by direct measurement or simple arithmetic. Nevertheless it is very necessary to attempt, as is here done, to apply rational principles, and make some approach to uniformity of practice in arriving at such assessments, so as to eliminate as many as possible of the factors making for uncertainty. One cannot measure fear or loss of confidence, but one can and should measure muscular wasting, deformity, and restriction of movement.

Perhaps the most valuable feature of this book is the analysis of the functions of the body, considered as a machine designed to carry out certain mechanical activities. The actions of muscles and joints are described in great detail and with a wealth of good diagrams; and the impairment of function which may result from injury is aptly illustrated by sketches of workmen actually using the tools of their trade. It is recognized that physical handicaps may be more or less successfully overcome, and sections on "Compensatory Possibilities" explain how this may be done in many cases.

The author is sceptical as to the value of physiotherapy for stiff joints, this subject being dismissed in a few lines with the observation (which will be widely endorsed) that "voluntary effort and active motion and exercise is the chief stimulant to repair and restoration of motion." Massage and other such measures are indeed useful mainly in so far as they help the patient to do things for himself. References to other authorities are rather meagre throughout the book, and it will come as a surprise to the English reader to find in the section devoted to a consideration of fractures (over two hundred pages in all) only one reference—and that a rather disparaging one—to the work of L. Böhler.

The principles of treatment of fractures are well set out, but there is no mention of the proper organization of fracture clinics, without which, in the opinion of the B.M.A. Fracture Committee, the results of treatment can hardly be much improved. Very little is said about the importance of re-education and vocational training of the physically handicapped—a subject which has received much attention in America and is beginning to interest those most concerned in this country. There is a well-written chapter entitled "The Industrial Back," in which nearly five pages are taken up with an account of how an examination of the back ought to be carried out, and a useful table shows the differential diagnosis of pain in the back. With regard to treatment it is remarked that "haphazard mechanical measures and half-hearted medicinal procedures often accomplish very little or no improvement, and create discouragement and economic loss." The victim of an injury to the back often has hardly any examination, and no more treatment than an occasional prescription for bromides and liniment.

In discussing the psychological factors in disability the author passes so readily from neurosis to fraud and back again that one suspects that he hardly distinguishes one from the other. After giving the admirable (and necessary) advice that "the individual examined should be shown all the tact and courtesy ordinarily extended to a private patient. Confidence otherwise will be broken, so that questions and tests . . . will be undependable," Dr. McBride goes on to say that the question of whether a complaint of pain is genuine or not may be settled by giving a "dose of sodium salicylate or aspirin by rectum, sufficiently large to be certain to produce insensibility to pain. Put through appropriate tests and note voluntary effort to show evidence of pain." One wonders whether the author really practises these "third degree" methods on his private patients, and if so what results of any value are so obtained. It seems hardly to have occurred to him that anxiety neurosis may exist as a clinical entity, much less as a seriously disabling disease, comparable in this respect to a chronic infection, and often requiring careful and prolonged treatment. There is an obvious slip on page 569, where it is stated that injury to the seventh cranial nerve may result in loss of hearing.

The book is excellently printed and illustrated, and should prove a valuable work of reference to industrial medical officers and others who may be called upon to advise as to claims for compensation for personal injury.

X-RAY INTERPRETATION

Roentgen Interpretation. A Manual for Students and Practitioners. By George W. Holmes, M.D., and Howard E. Ruggles, M.D. Fifth edition, thoroughly revised. (Pp. 356; 243 figures. 22s. 6d. net.) London: H. Kimpton. 1936.

This book is a brief survey of the field of *x*-ray diagnosis, covering the essentials of the subject and giving at the end of each chapter an extensive bibliography, which forms a good and useful guide to the student who wants more detailed information. The authors stress the need for constant collaboration with other branches of medicine and surgery if the full value of the *x*-ray examination is to be attained.

The first six chapters describe all the common lesions of bones and joints, and in addition deal with the general rules which form the basis of successful *x*-ray interpretation. The mistakes which are sometimes made on account of defective films and artefacts are pointed out, as are also anatomical variations and congenital abnormalities. A useful table of the appearances of the centres of ossification and the time of their fusion is given. All the common fractures and common diseases of bone are well described and illustrated by clear radiographs. An excellent chapter deals with the lungs, the diaphragm, the heart, and great vessels. The illustrations here are carefully chosen and of high quality. A brief survey of the gastro-intestinal tract and of the genito-urinary tract describes the normal and abnormal appearances met with. The final chapter describes fluoroscopic technique and the dangers to patients and operators from electrical discharges and over-exposure.

Although this book only gives a brief survey it is the outcome of many years' practical experience, and is an

ideal textbook for the beginner. It is beautifully printed and well illustrated. The authors are to be congratulated on the accurate presentation in simple form of the essentials of "roentgen interpretation."

TOPLEY AND WILSON'S BACTERIOLOGY

The Principles of Bacteriology and Immunity. By W. W. C. Topley, M.A., M.D., M.Sc., F.R.C.P., F.R.S., and G. S. Wilson, M.D., F.R.C.P., D.P.H. Second edition. (Pp. 1,645; 276 figures. 50s. net.) London: E. Arnold and Co. 1936.

It only seems a short time ago that we had the pleasure of reviewing Topley and Wilson's *Bacteriology*, yet seven years have elapsed since it first appeared. And during those years the science of bacteriology has been advancing with rapid strides—so much so that the preparation of the second edition of this textbook must have entailed an enormous amount of work. How well the authors have achieved this task is soon apparent, for, turn where one will, the information is right up to date and presented with a clarity and balance that makes both instructive and stimulating reading. As in the original edition, the book is divided into four parts: general bacteriology, systematic bacteriology, infection and resistance, and bacteriology as applied to medicine and hygiene, but instead of being in two volumes the new edition is bound as one. And since the book has increased by 300 pages this single volume is in truth a ponderous tome. No doubt there are solid arguments in favour of combining the two volumes in one, but this makes it almost impossible to carry the book about, and since it is so good that the reader will want to refer to it both in the laboratory and at home in the evening the only solution to the difficulty will be to possess two copies!

The lay-out of Part I has not undergone any radical change, but there is a new and valuable chapter on antigenic structure; originally this subject formed part of the account of serum reactions. Part II has mainly undergone amendment in detail, though the chapter devoted to the methods of obtaining pure cultures and their identification, which appeared in Part I of the first edition, is now made the opening chapter of Part II, a much more logical arrangement. There is also a new chapter on the micro-organisms of bovine pleura pneumonia and agalactia of sheep and goats, which the authors very rightly separate from the filterable viruses. The general account of the filterable viruses is now illustrated by some of Barnard's excellent photomicrographs, which have reproduced here quite well. The aspect of Part III has changed a good deal. It starts with an admirable account of the types of immunity, and this is followed by a consideration of the measurement of immunity in the living animal and the assessment of significance—a most instructive chapter. Then there is a new chapter in this section on immunity to virus diseases, and it is interesting to note that the authors conclude that no essential difference exists between viral and bacterial immunity, a view to which virus workers, in this country at any rate, would subscribe. Each chapter in this section of the book ends with a most useful summary.

Part IV remains much as it was in broad outline, but each chapter has been brought up to date, and in some instances this has entailed their being rewritten. Filterable virus diseases now receive four chapters in place of one, these diseases being grouped—not classified, for that as yet is impossible—according to the situation or type of the essential lesion, of the skin, the central nervous system, catarrhal or generalized infections, and those giving rise to the formation of tumours. This grouping no doubt finds its sanction in expediency and is as good as any at the moment, but it results in zoster appearing in the first group—those characterized by lesions of the skin—whereas its essential lesion is in the central nervous system. Perhaps it would be better, too, if the term herpes zoster were dropped and the disease called simply zoster, since this virus has no relation to that of herpes. And small-pox and varicella are placed in the group characterized by skin lesions and thus separated from measles, though all three probably have their primary lesion in the respiratory mucosa, generalization resulting in the secondary cutaneous lesions, the exanthem.

In their preface to the new edition the authors invite criticism, but it is difficult to find anything but praise for this excellent book. When it appeared seven years ago it soon claimed many admirers; this revised edition cannot fail to enhance its reputation.

FUNDAMENTALS OF NEUROLOGY

A Preface to Nervous Disease. By Stanley Cobb, A.B., M.D. (Pp. 170; 13 figures. 13s. 6d.) London: Baillière, Tindall and Cox. 1936.

Physiopathologie du Système Nerveux. Du Mécanisme au Diagnostic. By Paul Cossa. (Pp. 690; 193 figures. broché, 65 fr.; cartonné toile, 75 fr.) Paris: Masson et Cie. 1936.

Neurology has been studied as a science for longer than any other branch of medicine. But its scope and complexity are such that few have attempted in any comprehensive manner to formulate the scientific data on which it is based. Attempts to do this are made by Dr. Stanley Cobb and by Dr. Paul Cossa. Both books cover in greater or less detail the whole field of nervous integration and disintegration from the simplest spinal reflex to the highly complex processes of speech and thought. To achieve great success in such a task is probably beyond the powers of any one man, and neither of the present books is wholly satisfactory. Dr. Cobb's is evidently intended for undergraduate students. It is unpretentious, simple in style, and errs, where error is made, in over-simplification of complex facts. For greater conciseness some facts are stated in semi-diagrammatic summary, but the information given is accurate and up to date, and as a students' introduction to the study of nervous diseases it achieves its purpose well enough.

Dr. Cossa's survey is more elaborate, filling nearly 700 closely printed pages. While most attention is paid to disturbances of nervous function, each part of the nervous system is examined in detail, so that eventually a fairly complete system of nervous semeiology is presented to the reader. The histological constitution of the nervous system and its alteration in disease are dealt with summarily, most space being devoted to the clinical evidences of disease or degeneration in the nervous system. Where this book fails is not so much in its scope and manner of presentation as in the many errors and misstatements which it contains. Most of the recent developments in the physiology of the nervous system have been attained by the work of English and American physiologists, and many of these have not received due recognition in France, or if recognized have not yet displaced older and less well-founded views. It is indeed to remedy this ignorance among his fellow countrymen that Dr. Cossa has written this book, and as a remarkably full survey of the subject it is undoubtedly valuable. If the space allotted to groundless speculation and preconceived theory had been used for a clear and full statement of the more fundamental of the established facts its value would have been still greater. Undoubtedly many aspects of the physiology of the nervous system, such as the mode of integration and

function of the extrapyramidal system, as well as much of our knowledge of the physiology of sensation, still rest on clinico-pathological observations, and are differently conceived by different schools. While it seems well established that lesions of the substantia nigra produce a Parkinsonian state and lesions of the corpus subthalamicus choreiform movements, and that certain lesions of the lenticular and caudate nuclei produce similar clinical pictures, we are still far from a full understanding either of the connexions or the functions of these structures, and little is gained by dogmatic statements of the teachings of one school. The relation of painful sensation to the sympathetic system is another matter of controversy, most English authors holding that, although some fibres conveying impressions of pain run in the sympathetic chain, they are in all other respects similar to somatic sensory nerves. The French view that there is true sympathetic pain still, however, has many adherents in this country.

In spite of these failings there is so much valuable information in Dr. Cossa's book that it is well worth reading by those interested in the science of neurology.

HYGIENE

A Synopsis of Hygiene. By W. W. Jameson, M.A., M.D., F.R.C.P., D.P.H., and G. S. Parkinson, D.S.O., M.R.C.S., L.R.C.P., D.P.H. With a section on Personal Hygiene by G. P. Crowden, M.Sc., M.R.C.S., L.R.C.P. Fifth edition. (Pp. 623. 21s.) London: J. and A. Churchill. 1936.

Rather more than two years ago we reviewed in these columns the fourth edition of Professor Jameson's *Synopsis of Hygiene.* In the fifth edition, which now appears, much fresh material has been incorporated, especially in relation to the subject of public health law. Among other topics including new points of practical interest are the conduct and cost of health weeks, the warming and lighting of buildings, and personal hygiene, the last of which is dealt with in considerable detail and ranges over a wide field. The excellent articles on tuberculosis, venereal disease, hospital construction, and the welfare services have the merit of being at once informative and concise. The recent Order on milk designations is presented, with its tuberculin-tested, accredited, and pasteurized grades and methylene-blue reduction test. The consolidating Public Health Act of last year is well summarized.

The fifth edition will be welcomed not only by students for the diploma but also by every medical officer who aspires to be up to date in public health affairs.

Notes on Books

The main theme of *After Us,* by Mr. J. P. LOCKHART-MUMMERY, is contained in the apposite subtitle *The World As It Might Be* (Stanley Paul and Co., 18s.) The author traces the future evolution of modern tendencies in a logical and scientific manner, which nevertheless brings him to such startling conclusions that it is not surprising to find Lord Horder's foreword written in guarded language. In the chapter on "Preferential Breeding" a scheme of positive eugenics is set out, whereby all male children, with the exception of a small number of selected strains with scientifically scrutinized pedigrees, should be sterilized soon after birth. Should a woman desire a child she would be permitted, if free from hereditary taint, to make her choice from a list of specified sires and receive an artificial insemination. Mr. Lockhart-Mummery argues that family life would be in no way outraged by this surprising arrangement. The book also deals with questions of population, food, and transport; medicine and religion; indeed with all the essentials and accessories of human life. In addition to visualizing conditions of the future the author skilfully dissects those of the present day. His commentary on modern industry and finance is a scathing indictment. This is a highly controversial book. It shows evidence of a catholic range of knowledge on the part of one who has obviously devoted much thought to the problem of the betterment of the human race.

In *Comrades in Adventure* (John Smith and Son, Glasgow, Ltd., 3s. 6d.) Miss GERTRUDE RAMSAY looks at life as a pilgrimage of two companions, the ego and the body. Many pages are devoted to their reactions to illness, acute and chronic. The author states that good health is the result of a steady battle, an achievement which the vast majority do not sufficiently appreciate. It is surprising to read in the sentence following this conclusion that "we are unutterably bored by the health statistics which show how pure food, good water, good drainage have reduced illness and lengthened life." The book is written in simple and almost conversational style, and the sentiments expressed may prove helpful to those suffering mentally or physically. The author, however, is inclined to labour her points, and her theme might have been compressed into a much smaller compass.

Standards are necessary for all accurate work and apparatus is required for making the requisite estimations. In industry there are many problems of hygiene that can only be solved by accurate measurement of actual conditions followed by comparison with known standards. The International Labour Office has now produced a handbook—*Industrial Environment and Health* (Geneva, International Labour Office, 7s. 6d.). It describes instruments and methods, both physical and chemical, by which given situations can be compared with known standards. The latter are accessible to all in the literature of the appropriate subjects, but this is the first book of its kind to give handy and concise directions regarding the application of scientific analysis. It should be invaluable to chemists, engineers, and designers, but it will be of great service to all engaged in industrial medicine and hygiene. Few doctors will use it practically since they rarely have the specialized experience to apply the various techniques accurately. If, however, they possess a copy it can be passed to the officials most likely to benefit, and the resulting data can then be analysed and reported on by the doctor. This book should be in the administration library of every industrial concern and in the pockets of all who design and build factories.

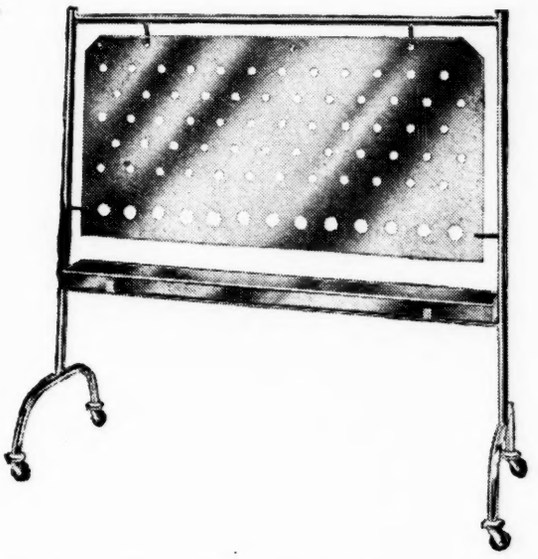
To say that certain truths and methods are now commonplace is by no means to detract from the tribute and acknowledgement due to those who at an early stage proclaimed and elaborated them; on the contrary, it is a statement of the success of those pioneers. So, too, the over-emphasis of a truth about health and a method of promoting health, with the result of establishing it as a cult, may be a real disservice by narrowing or misdirecting its application, and causing neglect of other truths and methods which are no less valid and useful. It is well that in a little book, compiled and arranged by A. R. CATON, entitled *Activity and Rest* (Philip Allan, 5s.) the life and work of the late Mrs. William Archer should be commemorated, and that the important truths that health means harmony, that there is such a thing as physiological and mental rhythm and balance, and that periods of relaxation (in the fullest meaning of the word) are essential to fitness and valuable aids to the culture of health, should be again presented to the public. Mrs. Archer performed a real service by showing how relaxation of body might be most completely attained and by establishing (at King's Langley) conditions which contributed to such complete attainment. This has now happily become an established feature in medical and psychotherapeutic practice.

Preparations and Appliances

SWAB COUNTING BOARD

Mr. CHARLES E. KINDERSLEY, F.R.C.S. (Bath), writes:

The illustration below depicts a swab counting board which has been in use at the Royal United Hospital, Bath, for some years past. It consists of a sheet of stainless steel with holes to hold the swabs. These holes can be cut to any required size, shape, and number according to the swabs used. Round



holes are best. The main advantage is the ease of cleaning as compared with hook patterns, which are a definite danger to the nursing staff. It can be made either as a wall-fitting on hooks from which it is easily removed, the hooks projecting six inches from the wall, a drip tray being fitted below, or it can be made on a movable stand.

The board is made by Messrs. Allen and Hanburys Ltd.

AN INTRAVENOUS TROCAR AND CANNULA

Mr. REGINALD A. KING, F.R.C.S. (of the Surgical Unit, St. Mary's Hospital, London), writes:

This design of trocar and cannula has been used by me for the past two years for the withdrawal of blood for transfusion, and in certain cases for the administration of fluids by the intravenous route where continuous infusion is required.

Transfusion Trocar and Cannula.—The instrument consists of a hollow silver cannula having a polished lumen with fenestrated end and side tube. The trocar is of stainless steel

and fits the cannula accurately. When in the lumen of a vein the trocar is withdrawn to its full extent, blood flowing via the side tube fitted with a convenient length of rubber tubing to a suitable container. I have found the instrument simple to introduce into donors' veins after the intradermal injection of 1 or 2 minims of weak novocain solution. Having been introduced into a vein no further damage occurs to the intima when the trocar point has been withdrawn. If clotting should occur in the cannula the obstruction can be overcome by one stroke of the trocar. All the parts of the instrument are gold-plated.

Intravenous Trocar and Cannula.—This instrument is of similar design but of finer bore, and is used where fluids are given by the intravenous drip method for many hours or days. The advantages of this design are that it is seldom necessary to cut down on a vein for its introduction, no further damage occurs to the intima after the trocar is withdrawn, and thrombosis is less likely to occur owing to the absence of ligatures. Adhesive strapping fixes the cannula to the skin, and absolute immobility of the limb is not essential.

These instruments have been made by Messrs. Weiss, Oxford Street, W.1.

AN EMULSION OF IODIZED OIL FOR X-RAY EXAMINATION OF EMPYEMA CAVITIES

Mr. WILFRID TRILLWOOD, Ph.C., pharmacist to the City of London Hospital for Diseases of the Heart and Lungs, writes:

The application of emulsions of iodized oil for the *x*-ray examination of empyema cavities was described by Mr. Denis Browne in the *British Medical Journal* of November 3, 1934. It appears, however, that no formula or details of preparation of such an emulsion have been published. The clinical requirements indicated by Mr. Denis Browne call for "a cheap, sterile, stable, and very fluid emulsion," which, furthermore, must be of the type that will wet evenly the sides of the cavity without breaking into globules. The oil, then, must be in the disperse phase, and in this condition the emulsion may be diluted with water indefinitely without separation of the oil.

Gum acacia is the obvious emulsifying agent for producing an emulsion of the oil-in-water type required. It has, however, the serious disadvantage of being liable to heavy contamination with micro-organisms, and must therefore be sterilized before use. Preliminary clinical trials were made with emulsions containing 5, 10, and 20 per cent. of the iodized oil, representing iodine contents of 2, 4, and 8 per cent. respectively. From a comparison of the skiagrams obtained the 20 per cent. emulsion was found to give the most satisfactory results.

FORMULA

Neo-hydriol (May and Baker)	20 c.cm.
Sterile mucilage of acacia	30 „
Ti-tree oil	1 „
Sterile distilled water sufficient to produce..	100 „

The mucilage of acacia is prepared in accordance with the *B.P.*, except that distilled water is used in place of chloroform water. It is sterilized by heating in an autoclave for one hour at 110° C. Considerable frothing occurs during the process, and for this reason a securely plugged capacious flask must be employed. Treated thus, it appears that the emulsifying power of the mucilage is somewhat impaired, and in consequence an inelegant product results unless an efficient homogenizer is used. For the purpose a small hand homogenizer, which may be autoclaved before use, may be obtained for a few shillings. The ti-tree oil is mixed with the neo-hydriol and successive portions of the mixed oils are added to the mucilage contained in a sterile mortar, triturating well before each further addition. The cream thus obtained is homogenized thoroughly, a little sterile water being added to "thin" the cream if necessary. The remainder of the sterile water is then added. The product is a thin milky-white emulsion, which shows no sign of "creaming" or separation. Chemical tests show that after keeping for four months in a white glass corked bottle exposed to light and frequently uncorked to allow access of air there is no trace of free iodine. A sample similarly treated was found to be sterile on examination in the pathological laboratory.

Emulsions prepared in a similar manner with "neo-hydriol viscous" and "lipiodol descendant" give equally satisfactory clinical results, but a downward creaming or separation occurs in a few hours, which requires considerable agitation to rediffuse. This tendency may be overcome by increasing the proportion of mucilage. Alternatively, the iodized oil may be diluted with a sterile fixed oil of low specific gravity and a correspondingly increased amount of mucilage used. In either case a very much more viscous emulsion would result, and in the latter would produce a very viscous cream; this would necessitate dilution with sterile water, resulting in a final product containing less than the optimum 20 per cent. of iodized oil.

BRITISH MEDICAL JOURNAL

LONDON

SATURDAY JANUARY 23 1937

WORK IN HYGIENE AND TROPICAL MEDICINE

A year ago the London School of Hygiene and Tropical Medicine had to report a large deficit. At the annual meeting of the court of governors on January 19 it was announced that the accounts for 1935–6 showed a small credit balance. This turning of the financial corner is due to continued generous support from industry, the renewal of contributions from certain colonial Governments which had had to suspend them at the time of the 1931 crisis, and the exercise of economy by members of the staff. Sir Austen Chamberlain, chairman of the court, has been instrumental in raising over £8,000 to finance the combined researches of the Divisions of Bacteriology and Biochemistry on the isolation of chemical fractions of immunological value from bacteria. Professor W. W. Jameson, whose five-year appointment as dean ended in 1936, has been reappointed to hold the office of dean concurrently with his professorship of public health. In his report to the governors Professor Jameson mentions that the public health course has been somewhat recast and the course in tropical medicine and hygiene substantially modified. Among the benefits of the rearrangement are that clinical teaching will be extended throughout the course of study instead of being restricted to the first part. The system of teaching in the Division of Epidemiology and Vital Statistics has been altered. When the school opened there were no modern books covering even approximately the field of epidemiology as now defined, but several such treatises have become available, and it is therefore possible to diminish the time given to didactic lectures and increase the allocation to teaching of the seminar type. Professor Greenwood, the director of the Division, says that no reforms of practice can prevent the D.P.H. course from being a serious undertaking, but it seems clear that future students will have a less harassing time than their predecessors. The holding of a part-time course in mental deficiency has been approved; this is intended for students of the D.P.H. class and for a limited number of other students, particularly school medical officers. The number of students admitted to the school in the year was 211, of whom 143 took the course in tropical medicine and hygiene, and thirty-nine the course in public health. Since the school started in 1924 1,633 students have followed the first of these courses, and 291 the second. Next to the British Isles the largest number of students (247) has been drawn from India and Ceylon. These countries have also been the destination of the largest number of students (482), followed by West Africa (180), East Africa (164), and Malaya (137).

The separate records of the Divisions and Departments give an impression of continuing work, not to be conclusively reported on in any one year. In the Division of Clinical Tropical Medicine the director, Dr. G. Carmichael Low, reports on his round-the-world tour with the British Medical Association, and calls attention to the fine hospitals at Singapore and elsewhere in the East, ideal places, he says, for young men keen on clinical work and research. Dealing with the work of the Division during the year, he states that a good number of cases have been available for demonstration at the Hospital for Tropical Diseases, but more are required, and these can only be obtained by carefully sifting the patients who pass through the Albert Dock and Tilbury Hospitals. Research on the causes of sprue has been conducted by Dr. Hamilton Fairley, and some valuable results have been obtained, though the aetiology of the disease still remains uncertain. The Department of Entomology carries out research work both at home and overseas; at home it has been concerned with the physiology of insects and in particular the effect of climate upon biting species. A substantial research grant has been placed at the disposal of the school by the Royal Society for an extended programme of research on certain aspects of the physiology of the *Anopheles*. Probably this work will be begun in London and continued at a selected spot in the Tropics. The Division of Bacteriology and Immunology is proceeding on a study of experimental epidemiology, aided by a grant from the Medical Research Council, which recently reported on the progress of this investigation. Experiments are now being initiated to test the effect on the epidemic process of varying the closeness and continuity of contact of mice at risk, and it is also intended during the coming year to apply to this investigation the results that have been obtained in the study of the relation of diet to resistance. Work has been carried out also on the immunizing properties of the fractions obtained from *B. aertryck* and *B. enteritidis* in a series of cross-immunity tests. Attention is being turned to *H. pertussis* in the hope that combined chemical and immunological studies may isolate an immunizing fraction from this important human pathogen. The work under industrial physiology includes an investigation into the types of employment open to deaf and

partly deaf persons, and, under industrial psychology, a study of misfits in industry. The report of the Ross Institute of Tropical Hygiene is incorporated in the school record, and gives an account of advice and assistance rendered to industrial and business undertakings in many parts of the world. It is stated that the Institute is a centre to which industry over-seas looks increasingly for help on matters connected with the health of European staffs and labour forces in the Tropics and sub-tropics. Finally, a list is given of over eighty papers or reports published during the year by members of the staff of the school.

INHALATIONAL THERAPY FOR RESPIRATORY DISEASES

The popularity of operations on the nose and throat in the treatment of asthma has declined in recent years, but there is still much enthusiasm for treatment aimed at correcting the morbid state of the respiratory tract. The Dowling pack, the Proetz method of sinus drainage, and the inhalation of carbon dioxide, all have their advocates as methods of relieving nasal congestion and infection. The inhalation of adrenaline and essential oils, by means of a simple hand spray or with mechanical aids such as an oxygen cylinder or an electric motor, is often successful in the paroxysms of asthma and in status asthmaticus, and very good results are reported with the use of concentrated solutions of adrenaline, from 1 to 10 per cent. As attacks are often precipitated by protein particles such as moulds, fungi, and animal and vegetable dusts in the atmosphere, efforts have been made to filter and condition the inspired air, of which the most elaborate have been the allergen-free cubicles of van Leeuwen.

The Duke-Fingard treatment for diseases of the respiratory passages, which has recently had a good deal of publicity in this country, appears to be a combination of air-conditioning with the inhalation of medicated vapours in a hermetically sealed chamber.[1] Courses of treatment are graduated, and, starting with three hours, the patient may increase his stay in the chamber up to sixteen hours daily. Considerable importance appears to be attached to Mr. Fingard's formula, which consists in general terms of "phenol in combination with a carefully blended mixture of the essential oils, aromatic substances, iodine, creosote, and other coal-tar derivatives." Any experiments which determined this particular blend of a great many variables are not described in the paper to which reference has been made. The treatment is believed to remove catarrhal conditions and clear up infection of the bronchi, and successes are reported not only in asthma but also in tuberculosis and other respiratory diseases. Voluntary financial contributions are now being sought to establish a grid system or network of clinics with Duke-Fingard chambers throughout the country.

Any treatment which brings relief to the numerous sufferers from asthma and its distressing symptoms will have the support of the medical profession, and we would not wish to damn this method with faint praise. The reacquisition of confidence when the vital rhythm of respiration has been restored is of immense value in asthma, as shown by the successes of psychotherapy and respiratory exercises, and if the sequence of attacks can be broken the patient is often well on the way to recovery. It seems premature, however, to decide that the results obtained with the Duke-Fingard treatment "appear to be permanent" or that the treatment is in any sense a cure. The history of asthma and tuberculosis is a long record of premature publication and over-optimism, and it is a pity that a treatment of this kind could not have been submitted for trial to the Asthma Research Council or the Therapeutic Trials Committee of the Medical Research Council, with precise details of the formula, before an appeal was made for public subscriptions.

[1] Fawcus, H., Greene, A. C., and Houston, J. W.: *Practitioner*, 1936, **137**, 740.

THE GEE-THAYSEN DISEASE

When Samuel Gee described a special form of chronic indigestion under the title of "coeliac affection" nearly fifty years ago he mentioned that it might be met with in persons of all ages. Subsequent authors, until recent years, have stressed the occurrence of the disease in children, but the late Dr. H. Thaysen of Copenhagen was insistent in his writings since 1929 that non-tropical steatorrhoea in adults was essentially the same malady as coeliac disease in children. A group of workers[1] in Dublin have recently reported in some detail ten cases of idiopathic steatorrhoea in patients between the ages of 19 and 63, and they suggest that the term "Gee-Thaysen disease" should be used for this particular syndrome. The characteristic voluminous, pale, fatty stools, anaemias of various types, tetany, hypocalcaemia, osteomalacia, wasting and dwarfing, abdominal distension, changes in the skin and the lens, and fractures are part of the complicated clinical picture in adults. Certain diagnostic criteria set out by the Dublin workers include a low fasting blood sugar, some increase in the basal metabolic rate, evidence of abnormal calcium metabolism, anaemia which may be hyperchromic or hypochromic, gastro-intestinal disturbances, and increase of fat in the stools with normal fat-splitting. Of the ten cases reported three presented

[1] *Quart. J. Med.*, 1936, **5**, 481.

multiple pathological fractures of bone and four had changes in the lens. Treatment must depend to a large extent upon the individual patient's various symptoms. The Dublin report suggests that the fat intake should be reduced to about 50 grammes a day unless diarrhoea is severe, protein should be kept high at about 120 grammes, and the carbohydrate intake is determined by the degree of abdominal distension from intestinal fermentation. In this connexion ripe bananas have been found to be as useful in adults as they are in the coeliac disease of children. The not infrequent achlorhydria is treated by hydrochloric acid by the mouth, and vitamin D and calcium must also be given. Iron is presented in large doses for hypochromic anaemia, and injection of liver extract has been found useful in the hyperchromic types. Along these lines the results are stated to have been gratifying, and eight out of the ten patients are reported as now leading practically normal lives.

TYPHUS AND TYPHUS-LIKE INFECTIONS

Drs. Yves Biraud and S. Deutschman have made an exhaustive study[1] of the important subject of the geographical description and epidemiology of typhus and typhus-like rickettsia infections to which a remarkably full bibliography of recent literature is appended. A survey is given of these diseases as they occur (1) in Europe and the Mediterranean basin, including Northern Africa, (2) in tropical and Southern Africa, (3) in North and South America, (4) in Asia, and (5) in Australia. The increase of louse-borne typhus during the past five years, not only in Eastern Europe but also in Northern and Southern Africa, South America, and Mexico, is attributed partly to the disappearance of the population immunized during the war and post-war pandemic and partly to the effect of the lasting economic depression in rural areas. During the last fifteen years typhus in Europe has occurred in three distinct regions—Central and Eastern Europe to the east of a line from the Gulf of Finland to the Adriatic, the Iberian Peninsula, and the British Isles. The first region is the most important, while in the other two there is merely a winter or spring recurrence of small and sharply limited outbreaks. Besides classical typhus two other forms of exanthematous diseases have recently been affecting Mediterranean countries—namely, boutonneuse fever and murine typhus. In Africa the distribution of typhus and typhus-like diseases is as follows: louse-borne typhus is still endemo-sporadic in North Africa ; it is endemo-epidemic in Egypt, among the Bantu population of Basutoland and the Union of South Africa and South-West Africa ; it has also recently appeared in South-West Uganda and Urundi. Murine typhus has been found in the ports and inland towns of North, West, and South Africa among rats and human beings. Lastly, tick-borne typhus-like diseases are to be found throughout North Africa and in the form of boutonneuse fever, and also in Central (Kenya) and South Africa as tick-bite fever. Turning to America we learn that Canada is practically free from all forms of typhus. In the United States louse-borne typhus, though repeatedly imported from Europe and Mexico, has proved incapable of taking root in recent years. The benign form of typhus known as Brill's disease still prevails in New York, Massachusetts, and Connecticut, but the cases are few. It is distinguished from classical typhus by its lack of communicability, peculiar autumnal incidence, and its mildness (mortality below 1 per cent.). Murine typhus occurs in the Eastern and South-Eastern States, where it has become increasingly prevalent, and has a fatality of about 5 per cent. In Mexico louse-borne typhus under the name of "tabardillo" has been endemic for centuries, with a fatality rate of 40 per cent. in Mexico and slightly lower in other cities. In Guatemala the disease is practically confined to the higher regions. In South America louse-borne typhus is by far the most important form in respect of the number of cases reported and the area of its distribution, but murine typhus is also found in Northern Chile, on the coast of Peru, and in the Argentine. In Asia the form which is the most widespread and causes the greatest number of cases is louse-borne typhus, which is prevalent in the northern half of the continent and extends southwards to the mountainous parts of Iran, Afghanistan, British India, Northern Indo-China, and South-Western China. In addition to epidemic typhus three main forms of sporadic typhus exist in India, the first of which is clinically and serologically identical with the tropical scrub typhus of Malaya ; the second, which is more severe and sometimes fatal, prevails in some southern districts (Deccan and Poona) from July to December ; while the third type, found among the natives of South India, is closely allied to benign murine flea-borne typhus. In Malaya, where tropical typhus was first described by Fletcher and Lesslar in 1925, three types of typhus-like diseases are recognized—namely, (1) "scrub" or rural typhus, which is the commonest and most severe ; (2) "shop" or urban typhus ; and (3) Japanese river fever or tsutsugamushi. In Australia louse-borne typhus disappeared in 1869, since when two distinct forms have existed. One on the eastern coast of tropical Queensland is known as coastal fever, pseudo-typhus, or sugar-cane typhus, while a similar but distinct form occurs in the non-tropical part of Queensland.

[1] *Epid. Rep. Health Section League of Nat.*, 1936, **15**, 1–16 ; 99–186.

WORKING-CLASS DIETARIES

The medical officer of health and the City Health Department of Newcastle-upon-Tyne[1] are to be congratulated on their dietary survey of sixty-nine families during a period of one week. This method of estimating the nutritional standards of a community is becoming increasingly popular all over the world. Though not infallible it is of value in that to a large extent it consists of facts. Facts about nutrition are badly needed in a field where opinions are so freely quoted, depending more often on political or social prejudice than upon accurate observation, and ranging from the view that there is no nutritional problem in

[1] *A Study of the Diets of Sixty-nine Working-class Families in Newcastle-upon-Tyne.* City Health Department, Town Hall, Newcastle-upon-Tyne. (1s.)

this country to the equally fallacious view that all the ills of the community spring from malnutrition. To the unbiased observer it is apparent that the health of the people could be greatly enhanced by an improved dietary. The Newcastle report emphasizes again that two factors are responsible for deficient family dietaries among the less privileged classes—namely, the economic factor, and the lack of knowledge of what are the most valuable foodstuffs and how small means can best be expended. The factor of ignorance is apparent in the extreme variations in the number of calories and amounts of protein and minerals consumed "per man value"—variations so great that, as the report points out, average figures for the groups have very little significance. The low milk consumption per man value is another proof of the need for social education. The economic factor might at first glance seem to be of less importance in that the difference between the employed and unemployed groups is not very striking, but it is not apparent whether the employed group was in fact economically well provided for. But looking closer into the difference between the employed and the unemployed groups we find that it applies to the more important foodstuffs, especially first-class protein and calcium. Moreover, the report concludes that "since the frequency distribution and the averages showed the unemployed diets to be consistently lower in every particular, irrespective of housing conditions, it is very probable that the diets of the unemployed as a whole were inferior to those of the employed." However hard may be the task of improving the economic circumstances of the general mass of the people, there is little doubt that much can be done by social education to improve their dietary and to enable them to expend limited resources on the more valuable classes of foodstuff. The difficulties of influencing food habits have been well discussed by Aykroyd in his book *Vitamins and other Dietary Essentials*, but that it can be done is clear from the many examples given by him and from the virtual disappearance of rickets from this country.

A PORTRAIT OF SIR HENRY THOMPSON

Somewhere about 1870 the celebrated artist and beautiful woman Mrs. Jopling painted a portrait of Sir Henry Thompson. Sir John Millais' portrait of the lady hangs in the Tate Gallery. She lived to a great age, 90, and Mr. Lindsay M. Jopling found the portrait in his mother's studio, and generously sent it to the Royal College of Surgeons of England, and they accepted it. On hearing, however, that the picture would be welcomed in Sir Henry Thompson's old school, University College Hospital Medical School, the president, Sir Cuthbert Wallace, and his council graciously sanctioned its removal there, on permanent loan. The portrait, cleaned and repaired at the expense of Sir Buckston Browne, now hangs in the staff-room at the end of the refectory of University College Medical School in University Street, Gower Street. Last week a little party welcomed the picture. It included the Lady Palmer, Dame Georgiana Buller, Sir Herbert Thompson (son), Sir Thomas and Miss Barlow, Sir Cuthbert Wallace, and the dean of the school, Mr. Gwynne Williams. The last-named will be very happy if any wishing to see the portrait will call and ask the hall porter the way to the staff-room. It is hardly necessary to remind our readers that Sir Henry Thompson (1820–1904) has two claims to remembrance. He was professor of clinical surgery at University College, London, a pioneer in the surgery of the bladder, and an ardent advocate for cremation in place of burial.

MEDICINE IN THE GOLDFIELDS

Medical men never show to better advantage than when they are called on to practise their art under primitive and difficult conditions. Medical practice can hardly have been more difficult, or the opportunities for brilliant improvisation more numerous, than during the "Roaring 'Fifties," the gold rush days in Victoria between 1850 and 1860. Gold was found in marvellous quantities in Bendigo and Ballarat; all sorts and conditions of people, British and foreign, flocked to these remote places, and the social, commercial, and political life of Victoria, itself quite a recent growth, was turned upside down. Medical practitioners were among the earliest and most energetic pioneers. Dr. E. A. Mackay[1] gives a vivid and detailed account of how they practised their profession in the chaos which existed round the newly found seams. Medical men, he said, were perhaps better able than other persons to accommodate themselves to the new conditions. If a doctor's patients went to the diggings, the doctor often followed. All he needed was a horse and tent, a leather case with a few instruments, and some straightforward drugs, such as laudanum and calomel; he already had the nucleus of a practice, and in his spare time he could do a little prospecting on his own account. Naturally there was a great inrush of quacks, who were a sore trial to the genuine practitioners. Dr. Mackay quotes from a book by a Mr. William Kelly, who visited Victoria twice in the 'fifties and had some amusing yarns to tell about what he saw, some of which were reprinted in the *Lancet* of 1860. Delirium tremens was one of the conditions a knowledge of which a doctor found most useful. Kelly stayed at a boarding-house where the visitor could get a bad imitation of any drink he liked to order. A doctor was practising in a space six feet by three feet canvassed off the public room; it was his surgery, laboratory, and dormitory. He slept on a central shelf, and a narrow shelf above and the floor below were crowded with drugs, bottles, and appliances. Prohibition was enacted fairly early in the days of the diggings, with the result that every boarding-house and shanty became a sly grog-shop, and the stock-in-trade comprised some strange mixtures. Though the really lucky diggers were supposed to order nothing but the best champagne, no spree was regarded as complete until the trembling stage was reached. The morning consultation would be crowded with battered-looking men and women from the lock-ups of the previous night, demanding leeches and diachylon plaster. Surgery was limited to unavoidable operations and the treatment of accidents. Dysentery, known as "English cholera," took a heavy toll, because there were no

[1] *Med. J. Austral.*, September 26, 1936.

sanitary precautions, the water supply was bad, and the food was contaminated by dust and flies. Typhoid broke out at Beechworth in 1856 and occurred year after year until the doctors learned of the part played by "carriers" and discovered some in a family which had for years supplied the town with food. One of the most difficult problems was an influx of dozens of Orientals, who knew neither English nor sanitation and suffered from leprosy, hookworm, filaria, and other Eastern diseases. Small-pox and typhus were controlled by quarantine and never obtained a footing. Many of the doctors on the diggings seem to have been extraordinarily efficient, self-reliant, dependable, and helpful to their widely scattered patients. Every long-settled district has traditions showing the esteem in which some of the old doctors were held.

"HUMAN BITE" INFECTIONS OF THE HAND

Infections of the hand are being better treated to-day than they were but ten years ago. This improvement is largely the result of a fuller knowledge of the surgical anatomy of the fascial spaces and tendon sheaths, their mode of infection, and the best methods of dealing with infected areas. In this connexion the work of investigators such as Kanavel of Chicago has been all-important, and serves to show that human anatomy is by no means a science that is "worked out," as some would claim. At the Annual Meeting of the British Medical Association in Bournemouth in 1934 one of the chief points in a debate on the treatment of infections of the hand was the necessity for regarding these lesions as of major surgical importance and of admitting such cases to the hospital wards. In a recent paper[1] Claude E. Welch of the Surgical Service of the Massachusetts General Hospital draws attention to an aspect of hand infections that has hitherto received only scant consideration—namely, "human bite infections." Only eighteen cases were discovered in a search of the records of the Massachusetts General Hospital which covered a period of eleven years, but undoubtedly many patients sustain small lacerations and mild infections from bites and do not attend hospital. Welch estimates that bite infections constitute about 1 per cent. of the cases of infection of the hand admitted to the hospital wards for treatment. These infections usually arise as a result of one person striking another in the mouth. The impact of a tooth produces a lacerated wound over the knuckle of the index or middle finger. The wound is usually tiny but deep, and may penetrate the expansion of the extensor tendon and enter the meta-carpo-phalangeal joint. For from six to twelve hours there may be little discomfort, but then the back of the hand becomes swollen and dusky, movements at the joint are painful, and malaise and pyrexia develop. When pus escapes it is malodorous, and has been compared with that from a lung abscess. The essential features are the site and nature of the lesion, the tendency for it to involve the joint, and the character of the purulent discharge. The infection is usually heavy and mixed, with streptococci and staphylococci, diphtheroids, and spirochaetes. If spirochaetes and fusiform bacilli are present in abundance the prognosis is worsened and early amputation may be called for. In the more severe cases of joint infection Welch believes that it is wise to incise both adjacent web spaces, divide the lateral ligaments of the metacarpo-phalangeal joint, and open the capsule widely. For early cases he advises diathermy excision of the laceration. He finds that amputation of the affected finger is required in one out of ten cases treated within twelve hours; if operation is delayed for from one to seven days amputation will be necessary in one out of three cases, and half of the others will retain a comparatively useless finger.

[1] *New Engl. J. Med.*, 1936, **215**. 901.

THE INFLUENZA EPIDEMIC

The epidemic is proceeding on normal lines and there is no reason to expect that it will prove either as widely spread or as severe as that of 1933. It is spreading to the North, and reports all suggest that it is conforming in type to what we have been experiencing in the South-East and the Midlands. The weekly number of deaths shows a steady increase, but it must not be forgotten that this number is bound to be weighted by serious cases in which the illness began either in the week preceding or even earlier. The same applies to the number of cases in hospital, as the figures for each succeeding week are cumulative, insomuch as some cases are carried forward. In London the number of notifications of pneumonia was 454 in the week ending January 16, an increase of thirty-seven over the number for the previous week, but that this is not indicative of an extension of the epidemic is shown by a marked falling off in requests for admission to hospital. The deaths from influenza in London were 344 for the week ending January 16, as against 311 in the previous week. With the prevailing acute pressure on beds in hospitals of all types the extent of the demands received for beds for influenza cases in the London County Council hospitals is a reliable guide to the number of cases thought by private practitioners to be serious enough for hospital treatment. The figures for the past three weeks are therefore of great interest: they were—for the weeks ending January 2, 9, and 16, 1,377, 1,602, and 921 respectively. The clinical picture shows no change, pneumonia being still exceptional and occurring comparatively rarely in the young adult age groups: this is completely at variance with the experience of 1918, and gives still further justification for the opinion that, distressing and inconvenient as it admittedly is, the present epidemic is not likely to be of major public health importance.

HALF-YEARLY INDEXES

The usual half-yearly indexes to the *Journal* and to the *Supplement* and *Epitome* have been printed; they will, however, not be issued with all copies of the *Journal*, but only to those readers who ask for them. Any member or subscriber who wishes to have one or all of the indexes can obtain what he wants, post free, by sending a postcard notifying his desire to the Financial Secretary and Business Manager, British Medical Association House, Tavistock Square, W.C.1. Those wishing to receive the indexes regularly as published should intimate this.

ENDOCRINES IN THEORY AND PRACTICE

This article is one of a series on Endocrinology contributed by invitation

THYROID EXTRACT IN CONDITIONS OTHER THAN MYXOEDEMA

BY

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The discovery that a drug acts successfully in one disease inevitably leads to a trial of its powers in other conditions. At first it will be tried in allied disorders in which it may be expected to produce some benefit, and later it will be given empirically in many other complaints. Such has been the history of thyroid extract. A survey of the literature will show that it has been employed in almost every department of medicine and that it has been recommended for the most unlikely conditions.

The active principle of the thyroid possesses definite pharmacological actions both in the healthy body and in disease. Thyroxine increases general metabolism and raises the activity of many organs and tissues in the body. Among other important actions it stimulates the sympathetic nervous system, it has secondary effects on the circulation, and it plays some part in controlling the water content of the body. The extract is probably most successful in therapeutics where some definite pharmacological action is made use of. It must be remembered, however, that it is not possible to isolate the different actions, and when the drug is given for one specific purpose other unwanted side actions are apt to appear.

Subthyroidism and Obesity

Mild degrees of subthyroidism not sufficiently marked to warrant a diagnosis of myxoedema are probably more common than is generally thought. One or more of the following symptoms may suggest such a condition: dry skin and hair, mental depression or dullness, forgetfulness, loss of energy, a tendency to chronic constipation, a predisposition to colds, and some vasomotor disturbances; a useful confirmatory sign is a thinning or loss of hair from the outer third of the eyebrow. Such signs will indicate the administration of small doses of thyroid, and the improvement in the general health of this class of patient under such treatment is often remarkable.

Thyroid has been much used in the treatment of obesity, which may be caused by different factors in different individuals. Some obese patients are definitely subthyroid, showing some of the signs mentioned above and often having a characteristic "round moon" face; in these thyroid extract is obviously indicated. It is also given in cases with no signs of thyroid insufficiency, and in those in which there is disturbance of the other endocrine glands. Here the idea is that the thyroid extract will stimulate the general metabolism so that the patient may be able to use up some of his excessive stores of fat. It must be remembered, however, that in obesity the basal metabolic rate is not abnormal. It is usually within the normal range, and since the basal metabolic rate is calculated on the area of the body surface, which, of course, is increased in these subjects, the metabolism may be actually in excess of that of a person of average proportions.

Thyroid extract given to obese individuals must tend to raise the metabolism above normal, but it cannot be relied on by itself as a treatment for excessive weight. Given alone it is often unsuccessful, for it increases the appetite, which neutralizes its action on the general metabolism. As an adjunct to carefully chosen subcaloric diet (say 1,000 calories) it has a most important place in therapy. Obesity in some patients, particularly those who have been large eaters, can be successfully reduced by dieting alone. In others dieting fails to accomplish all that is desired. For a time they lose weight on the low diet satisfactorily enough; then the metabolism adjusts itself at a new level and loss of weight gradually ceases. When this point has been reached the diet should be continued as before and thyroid treatment should be started, the dose being slowly increased till a satisfactory rate of fall has been again secured. In this way the patient may continue to reduce in weight for many months. When thyroid is begun there is little evidence of its action on the weight for three or four days, then a rapid drop takes place during the next few days, apparently due to displacement of fluid from the system. The fall after this is less rapid, but continues steadily for a time. Under continued administration of thyroid the pulse rate will quicken and the basal metabolic rate gradually rises. A value of + 20 to + 25 may be reached before cardiovascular symptoms appear. The amount of thyroid which obese patients can take without trouble varies with each individual. Some appear to be excessively sensitive, while others can tolerate very large doses without discomfort. When reduction of weight has been completed a few patients can keep their weight down without further treatment; some must continue to restrict their diet; and others must take small doses of thyroid extract if they are to prevent reaccumulation of fat.

Use of Thyroid in Various Disorders

The thyroid gland has important interrelations with the rest of the endocrine system, acting with some of the hormones and against others. Thyroid extract has been employed in place of other hormones which were not available on the market, but the successful commercial production of an ever-increasing number of endocrine substances will limit this use of it. It is still often given in certain cases of pituitary insufficiency and in such conditions as amenorrhoea and the disturbances of the menopause. It is also a common ingredient of pluriglandular compounds, and in some may be the *only* active agent. In most cases it is probably best to administer the thyroid separately, so that the most appropriate quantity may be more accurately judged.

Thyroid extract is sometimes of value in the treatment of asthma. When the patient is grossly overweight and the excessive fatty covering of the chest embarrasses the breathing its use can be readily understood. In cases of asthma thyroid extract may act in another way. It may stimulate the adrenals and it increases the sensitivity of the sympathetic elements on which adrenaline acts. Because of the stimulating action on metabolism thyroid extract cannot be freely given in the thin type of asthmatic.

The striking improvement in the skin of myxoedematous patients under treatment has suggested the use of thyroid extract in dermatology. It has been tried in a large variety of skin lesions, but is now mostly advised in chronic conditions of a non-inflammatory nature. The skin may be kept in a tolerable state in some cases of

ichthyosis by small doses of thyroid taken regularly. In others it is less successful, but the remedy is worth persevering with. Claims have also been made for thyroid extract in psoriasis, but the evidence of a beneficial action here is not so clear. In other skin conditions indications for thyroid extract are less definite.

The improved cerebration of the myxoedematous patient under treatment has led to the employment of thyroid in certain mental disorders, especially those associated with dullness or depression, and good results are often obtained in such cases.

Another interesting and little-known use for thyroid extract is in the chronic oedemas of renal disease. Some diuresis is commonly observed in myxoedemas and other cases under treatment with thyroid extract, which has been strongly recommended for the persistent oedema of the nephrotic syndrome, and it may be of definite assistance. It is interesting to note that this class of patient can tolerate relatively large doses of the drug without inconvenience.

Formerly the extract was employed in diseases of the thyroid gland itself; but such treatment is especially dangerous, for overaction may be very easily induced. When subthyroidism develops in a case of goitre, thyroid extract is of course indicated. Other uses are less easily explained and may be entirely empirical. It has been prescribed in those chronic disorders in which potassium iodide is given—arteriosclerosis, fibrositis, chronic rheumatism, etc.—probably with the idea of stimulating local metabolic changes and increasing the removal of waste products. Thyroid extract has been put forward as a means of preventing the development of eclampsia, and in the fully developed case enormous doses have been taken. The list of diseases for which it has been recommended might be indefinitely extended, but this would serve no useful purpose.

Method of Administration

The secretion of the thyroid gland is a very powerful agent, and serious harm may result if its action is not carefully controlled. In no circumstances should the drug be left to a patient to take freely. Treatment must be closely supervised by the medical attendant, and the patient should be seen at least once a week. The dangers are the development of hyperthyroidism and in particular cardiac symptoms, and the risk is increased by the fact that these may appear slowly. A point of great importance is that the full effects of the drug are not seen for several days after it has been begun or the dose has been increased. This fact is in keeping with other metabolic phenomena. For example, an increase or reduction of protein or of carbohydrate in the diet does not exert its full effect on metabolism for about four days. The results of administering thyroid extract can be readily followed in an obese patient who is weighed daily. The influence on the weight is seldom noticed before the third or fourth day, and the maximum increase in pulse rate does not occur for some time longer. The full increase in the basal metabolic rate is also slow in developing. For this reason it is a good rule not to order an increase in the amount of the drug at intervals of less than a week. Further, it is impossible to foretell exactly how much thyroid an individual will require or how much he will be able to tolerate. In all cases, therefore, the initial dosage should be small. Obese subjects are especially intolerant of the drug, and for them the initial dose should not exceed half a grain twice or three times a day. Other patients may begin with double this amount. Owing to the very slow development of the action there is no reason why the daily quantity prescribed should not be given in a single dose, but the practice of taking medicine three times a day is firmly established in the lay mind. If the drug is to be taken for a prolonged period it is often advised that it be discontinued for a few days each month so as to lessen the possibility of overaction developing.

Small doses are often adequate for certain purposes, but in other cases it is often desirable to push the drug to the limit of tolerance in order to get its maximum effect. In these circumstances signs of overaction must be constantly looked for. The earliest evidences of intoxication vary in different patients. Some complain of palpitation, tremor, nervousness, or headache when taking only small amounts. Patients with fatty hearts are particularly prone to develop cardiac symptoms, and the possibility of auricular fibrillation must be kept in mind. The drug must be reduced or discontinued at once if any symptoms appear. The physician's best guide for controlling cases under thyroid treatment is the rate of the pulse. It is usually perfectly safe to continue administration so long as the pulse rate remains under 100 beats per minute. Obese patients who are otherwise in good health will often tolerate 6 to 9 grains of thyroid (*B.P.*) daily, and I have given for a time as much as 18 grains to a woman of 30 who weighed 28 st. Patients with the nephrotic syndrome are especially tolerant to thyroid, and can continue relatively large doses with impunity.

The doses mentioned above are in terms of thyroid *B.P.* (thyroid extract), and this is probably the best preparation for general use. Thyroxine has no special advantage except that it can be given intravenously and may come into action more rapidly, There are also on the market other preparations of thyroid substance for which special claims are made, such as being less liable to upset the heart than the official preparation. With these, as with the standard drug, the most suitable dose has to be determined by the method of trial and error.

BRITISH EMPIRE CANCER CAMPAIGN

In the absence of Viscount Hailsham, Sir Cuthbert Wallace, President of the Royal College of Surgeons of England, presided at the sixty-first quarterly meeting of the Grand Council of the British Empire Cancer Campaign, held at 12, Grosvenor Crescent on January 11.

The Council was informed that Viscount Hailsham had sent a letter to the King tendering loyal and humble thanks for the services which His Majesty had rendered the cause of cancer research as the president of the Campaign since 1924 to the time of his accession to the throne. A message in reply from His Majesty was read.

The Council tendered its sympathy to Lady Bland-Sutton in her recent bereavement. The late Sir John Bland-Sutton was one of the founders of the Campaign, and was vice-chairman of the Grand Council for ten years. Mr. Stanford Cade, F.R.C.S., of the Westminster Hospital, was invited to become a member of the Grand Council, and Sir Harold Mackintosh, Bt., and Mr. B. T. Clegg were also invited to become members to represent the Yorkshire Council in addition to the Earl of Harewood.

The following grants, in addition to those totalling £28,995 which were made at the annual meeting in November, were approved on the recommendation of the Scientific Advisory Committee: £200 to cover the cost of special physical investigations being carried out under the direction of Dr. F. G. Spear at the Strangeways Research Laboratory, Cambridge; £500 for one year to Dr. H. J. Phelps, whilst carrying out experiments in connexion with Dr. Lumsden's anti-cancer serum under the supervision of Dr. Gye and Professor McIntosh; and £440 for one year to Miss C. F. Fischmann, working in the Bernhard Baron Institute of Pathology at the London Hospital.

NATIONAL RADIUM REPORTS

THE RADIUM TRUST

The seventh annual reports of the National Radium Trust and the Radium Commission were published at the end of last week.[1] The report of the Trust, covering the twelve months to March 31, 1936, mentions the following changes in its membership. Mr. Ramsay MacDonald, Lord President of the Council, succeeded Mr. Baldwin as chairman; Sir Kingsley Wood, Minister of Health, succeeded Sir E. Hilton Young (now Lord Kennet); Sir William Bragg, President of the Royal Society, succeeded Sir F. Gowland Hopkins; Sir Cuthbert Wallace, already a co-opted member, succeeded Sir Holburt Waring on becoming President of the Royal College of Surgeons of England; and Sir Humphry Rolleston, acting President of the British Medical Association, succeeded Dr. S. Watson Smith. In place of Sir Comyns Berkeley and Sir Arthur Hall, who had ceased to be members of the Radium Commission in accordance with the provisions for retirement in rotation, Sir Cuthbert Wallace and Mr. G. F. Stebbing, both members of the Radium Commission, were appointed members of the Trust.

The report states that the need for further considerable supplies of radium envisaged by the Commission, together with the trend towards the use of larger units, will, during the next few years, make demands upon the Trust far beyond its present financial resources. It had been hoped that a considerable increase of the national stock of radium might form part of the National Memorial to King George V, but the final decision of the Memorial Committee was in favour of another charitable object. An account of subsequent arrangements by which radium is being made available to the Commission during 1936–7 will be given in the report for that year. A bequest, amounting to about £7,000, of the late Miss Helena Day "for the purchase of radium for cancer research and cure" is now under the administration of the Trust.

With regard to the small quantity of radium loaned to the National Physical Laboratory for the purpose of physical research, it is stated that further investigations have been carried out concerning problems connected with gamma-ray dosage and protection. A parallel-plate "free air" chamber erected during the year is believed to be the largest of its type ever constructed. It has vertical electrodes 3½ metres high, and affords an electrode separation of three metres, such dimensions being found to be necessary in order to measure all the energy of the long-ranged secondary electrons produced by the gamma rays. The question of the protection of radium workers has also received attention, and a paper[2] has been published dealing with the protection afforded by building materials. This paper provides data which should be useful in designing rooms for radium beam therapy.

[1] Seventh Annual Reports of the National Radium Trust and Radium Commission 1935–6, including a Statistical Report. Cmd. 5342. H.M. Stationery Office. 1s. 6d.

[2] Kaye, G. W. C., Bell, G. E., and Binks, W.: *Brit. J. Radiol.*, **9**, 161, March, 1936.

The Radium Commission

The Report of the Radium Commission covers the twelve months to July 31, 1936, during which period there were no changes in the personnel of the Commission. The distribution of the various radium centres in Great Britain is shown in the accompanying map, reproduced from the Report. The Commission notes with approval the increasing tendency of centres to employ a physicist, whose expert knowledge is valuable in questions of dosage and protection. With regard to patients attention is drawn to the unfortunate position of the middle-class section of the community. In several centres no system of "pay-beds" is yet available, and it is stated that the Commission would view with sympathy any practical scheme for making national radium available to this class of patient, whether treated in the parent hospitals or in associated institutions. Also under present conditions patients in remote country districts may have difficulty in obtaining radiation treatment. Although the Commission favours the policy of concentrating the actual treatment at the various centres, it warmly advocates a dependent system of "outpost" centres for purposes of examination, diagnosis, and follow-up. It is desirable that the influence of every radium centre should be disseminated as widely as possible in the surrounding districts. The Report stresses the importance of securing the close co-operation of municipal and county authorities, for it is roughly estimated that out of some 40,000 patients suffering from forms of cancer suitable for radiation treatment only 8,000, or approximately one in five, are actually thus treated.

With regard to the question of treatment by large radium units it is remarked that at present many cancer patients delay in seeking assistance through fear of the treatment. From this point of view surface irradiation is preferable to interstitial irradiation. The Report stresses the responsibility of the larger and better-equipped centres for the provision of the trained workers of the future. "Radium is not only valueless but dangerous in the absence of knowledge and experience."

National Radium Centres

Summaries follow recording work and progress at the National Radium centres, the regional centres, and the recognized hospitals. The Aberdeen centre is fortunate in a close collaboration between university and hospital, for both the radium officer and the physicist hold full-time university lectureships. Much attention has been paid to the questions of protection of the staff and to the accurate measurement of dosage in roentgens. "Radium finders" of both the electroscopic and Geiger types have been installed. At the Birmingham centre the radon plant, which is under the direction of the physics department of the university, continues to increase its output. The centre will probably use the radium at present in solution to assist in building up a large radium unit, the university meanwhile making itself responsible for a new supply of radium to replace that in the radon plant. About one-third of the radon output is utilized by the centre and the remainder is supplied to outside bodies. At the Bristol centre the position is less satisfactory. "It would seem that the centre, during the five years of its existence, has not been successful in gaining the confidence of the profession of the district which it serves." Nevertheless, municipal and county authorities are showing increasing interest in radiotherapy, and a scheme of diagnostic and follow-up clinics has been initiated in Wiltshire. At the Cardiff centre the urgent and paramount need is an apparatus for deep *x*-ray therapy necessitating the services of a whole or part-time physicist. The Edinburgh centre, to which a full-time physicist has now been appointed, has effected a satisfactory fusion of the organizations dealing with deep *x*-ray therapy and radium. A one-gramme unit has been in operation during

the year, providing experience which will be useful when larger mass units become available. The follow-up of patients is efficient, with less than 1 per cent. of cases untraced.

Of the two Glasgow centres that at the Western Infirmary shows a close liaison between the *x*-ray and radium departments, and a common basis for dosage measurements in roentgens has been found possible. At the Glasgow Royal Infirmary a new deep *x*-ray set has been provided. Despite the large area served by this centre, there is no waiting list among cancer patients; follow-up measures are organized so successfully that no case remained untraced. The Leeds centre has a one-gramme unit working twenty-four hours per day in three shifts of eight hours. There is at present no provision of "pay-beds" in the Infirmary, but it is expected that these will be available when the building of the new hospital is completed in some three years' time. At the Liverpool centre further developments await the proposed reorganization of hospital services in the city. The Manchester centre continues to discharge the admirable function of training radium therapists and radium officers, who in due course disseminate modern methods elsewhere. Pending the provision of a radium beam experience is being gained in the employment of special "radium collars." The radium collar is also in use at the Mount Vernon Hospital, London, which, like Manchester, fulfils the role of a school of radiotherapy. At the Newcastle centre, where for various reasons difficulties have been encountered in the past, the number of patients receiving radiation treatment is increasing. There is a waiting list among cancer patients on account of scarcity of beds. Treatment under the auspices of the Sheffield centre is carried out in five different hospitals, an arrangement tending to produce administrative difficulties. Some merging of hospital activities in the city is predicted in the near future, a step which should facilitate the work of the centre.

Reports follow describing progress in the regional radium centres at Lincoln, Norwich, Plymouth, Southampton, and Stoke-on-Trent, and in the "recognized" hospitals at Bradford, Burnley, Leicester, and Wolverhampton.

Radium Beam Therapy

The value of radium in large units for the treatment of certain classes of cancer is a question to which the Commission has devoted much attention. The Commission has been unable to provide for the setting up of a unit larger than one gramme in any of the centres. Apart from the restricted stock of radium at its disposal, the employment of mass radium demands specially trained personnel and special equipment. The Radium Beam Therapy Research has, however, been employing three five-gramme units in an investigation of the value of beam therapy in cancer of the mouth, pharynx, and larynx. It is hoped that the results of this investigation will provide useful data for the guidance of the Commission in its future policy.

Several factors point to the need for increasing the available supply of radium. An extension of the work of the present centres is envisaged, and the establishment of new centres is also desirable. Further, there is an increasing tendency to replace the interstitial and intracavitary use of small quantities of radium by the external application of large quantities at a distance. The number of patients who can be treated by a mass unit in the course of a year is comparatively small; an increase in the number of mass units is therefore required.

A Statistical Survey

The Report concludes with an appendix of more than forty pages, "a Statistical Report of the Results of Radium Therapy in the Treatment of Cancer of Certain Sites at Hospitals associated with the Commission." In this appendix separate chapters are devoted to carcinoma of the breast, the cervix uteri, the lip, the tongue, and the floor of the mouth. The survey is based upon an analysis of the records of more than 5,600 patients, drawn from hospitals distributed throughout the whole country. The assessment of the value of different methods of treatment by the use of survival rates is a matter of the greatest difficulty on account of the large number of different therapeutic combinations employed. In treatment of carcinoma of the breast eighty-six such combinations were distinguished. Among the inferences drawn from the survey, which covers the whole of the years 1930, 1931, 1932, the following may be cited. Patients suffering from carcinoma of the lip, tongue, and cervix uteri showed an increasing tendency to come early for radium treatment. Patients with the highest survival rate in each stage of the disease were those for whom a histological diagnosis was made. In treatment of carcinoma of the cervix the employment of deep *x*-ray therapy increased, while the practice of interstitial needling of the cervix diminished; in carcinoma of the breast surface irradiation was more extensively used. Patients with carcinoma of the cervix of the age of 50 years or over showed a higher survival rate than those under 50, this difference being especially marked in the more advanced stages of the disease.

RESEARCH IN LUNACY AND MENTAL DEFICIENCY

The second part of the twenty-second annual report of the Board of Control, covering the year 1935, comprises a summary of clinical and scientific investigations completed and in progress in mental hospitals and kindred institutions in England and Wales; entries recorded by commissioners at these establishments; and lists of approved hospitals and nursing homes where persons suffering from mental disorders and deficiencies can be accommodated. It opens with a supplement on research and other scientific work in the year under review, and notes are incorporated on the various researches at different centres. Some idea is thus given of the various directions of clinical and experimental study at present, and references are also made to publications by members of the staffs in professional journals during 1935. The following notes illustrate the wide field in which research is continuing.

The Brain and Mental Disorder

At Stoke Park Colony, Stapleton, Bristol, an examination was undertaken of the brains of fifty-five deceased defectives, and the findings were compared with those in twenty-eight normal cases. In this series the proportion of brain size of defectives to normals was 76 to 100, suggesting that most defectives were so because their brains were too small. The fact that this estimate includes defective brains pathologically enlarged by hydrocephalus, tuberous sclerosis, excessive gliosis, and similar conditions heightens the probability that in the great bulk of defectives the brain is only two-thirds the normal size. It is pointed out that the size of the brain can be deduced from that of the head, and that therefore a scientific separation can be made between the "educable" and "ineducable" defectives, with a corresponding diversion of labour into the more profitable channels. In none of the defective brains was the general appearance normal; structural peculiarities noted included microgyria frequently and porencephaly twice; exposed insula in many; absence of the corpus callosum once; hydrocephalus three times; imperfect development of the opercula; abnormal presence of the anthropoid lunate sulcus; divided central sulcus (an extremely rare developmental error); tuberous sclerosis; lobar sclerosis; and in most cases a gross irregularity of the cerebral sulci and convolutions. Whereas in normal brains the relative proportions of precentral (effector) and post-central (receptor) areas was 38.7 to 100, in the defectives it was only 37.5 to 100, and it is believed that this phenomenon

may have some neurological significance. The conclusion is reached that mental deficiency is the result and consequence of a brain too small for its proper functions; a disorderly arrangement of the cells of the cortex was also found.

Histological innervation of the cerebral circulation in man was undertaken at the Manchester Royal Hospital, Cheadle, Cheshire, with a view to elucidating the nature of epilepsy and allied psycho-neurological states. It was shown that the intracranial circulation possessed a sympathetic innervation not differing materially from that in the remainder of the systemic circulation with which it was continuous. Morphological support was thus afforded for the physiological and clinical hypothesis that the cerebral circulation possesses a vasomotor and a vasosensory mechanism, which may well be concerned in such conditions as migraine, certain forms of vascular headaches, and "cerebral angiospasm," a syndrome simulating cerebral thrombosis. Again, an explanation is now forthcoming of the post-operative phenomena which follow cervico-dorsal sympathectomy. Reference is made to the report in the *Journal of Neurology and Psychopathology* (1935) by W. R. Ashby and R. M. Stewart of the Leavesden Mental Hospital that the convolutions in the brains of defectives are a little narrower than in the normal brain, that they are slightly smaller all over, and that there is a strong tendency to variability.

Chronic Infective Processes

A long and impressive communication from the Birmingham Mental Hospital Committee relates mainly to investigations by a team of workers who concentrated on the relation of bodily processes, and especially septic foci in the skull, to mental disorders from the points of view of aetiology and treatment. Nasopharyngeal sepsis requiring treatment was found in 1,888 out of 2,068 cases of mental disorder, tonsillar disease being present in 1,336 and infection of the nasal sinuses in 1,425, out of which latter series ethmoidal disease was present in 812 and sphenoidal disease in 573. Local treatment benefited the mental condition in a large percentage of these. Clinical details are recorded of thirty-eight cases to illustrate the therapeutic significance of this factor in mental disease. Transmissible familial infection is submitted as a more hopeful and practical alternative to the view associated with heredity, and is illustrated by notes of four families in whom mental disease occurred and was believed to be due to sepsis. It is suggested that the nasal sinuses should be systematically examined during necropsies at all mental hospitals, with an adequate number of corresponding examinations at general hospitals to serve as controls. References to infections as an aetiological factor appear in the reports of some other hospitals. For example, research work has been proceeding since December, 1934, at the East Sussex County Mental Hospital in respect of infections of the renal tract; injections of autogenous *B. coli* vaccines were definitely valuable in two out of seven cases. From the results of routine urinary examinations at the Cheshire County Hospital, Macclesfield, it would appear that some degree of nephritis is very prevalent among the subjects of mental disease, granular renal casts being often found. The causative organism in pyogenic infections of the urinary tract was always found to be *B. coli*, except in one case secondary to prostatic enlargement in which *B. morgagni* was persistently present.

Dysenteric and Typhoid Infections

Thirteen communications from mental hospitals and three from mental deficiency institutions record work in this connexion. Prophylactic inoculation against dysentery has been continued for the seventh year among patients newly admitted to the Bristol City Mental Hospital, where the Flexner WX strain is used. No case occurred in 1935, and in the seven years there were only fifteen cases compared with 157 in the previous seven years before the inoculating began. The method is therefore warmly commended, but the question is raised as to the duration of immunity. It is concluded that, while the first inoculated patients probably still retain some degree of resistance to the infection, it is advisable to re-inoculate all patients who received their injections more than five years ago. This was undertaken, therefore, during 1936. The report includes the seventeenth post-war report on asylum dysentery and allied infections from the West Riding Hospital, Wakefield. Nine cases of dysentery occurred in 1935, all in the chronic male wards, the causative organism in eight being *B. flexneri* W. Research is proceeding on anti-dysenteric vaccines. The great importance of the weekly examination of the faeces of carriers is emphasized, and also the value of Wilson and Blair's agar medium for isolating *B. typhosus* from the stools. Mention is made in the Leavesden Mental Hospital communication of a typhoid carrier, a man aged 62, who ceased to excrete typhoid bacilli for three years; the gall-bladder was then removed and the bile was found to contain typhoid bacilli, so that the patient was still technically a carrier. From Denbigh comes an account of full and elaborate investigations of an outbreak of dysentery which, with the communications from North Riding, Wilts, Caterham, and East Sussex, indicate how much labour and time adequate attention to these visitations involves, while that from the last-named hospital shows the importance of having laboratory facilities on the spot in order to deal promptly with the material.

Biochemical and Physiological Researches

Special studies are now being made of the mode of action of narcotics, including their effect on the blood calcium content. At the Cardiff City Mental Hospital it was found that during prolonged narcosis there was a slow fall in the serum calcium of variable extent (0.3 to 2 mg. per 100 c.cm.), which reached its maximum in four to seven days. A day or two after the cessation of this treatment the serum calcium figure rose to the original level or even exceeded it without any dietary change having been made. It is concluded that somnifaine narcosis brings about this result by lowering the activity of the parathyroid glands. The fall is not pathological, and no contraindication to this treatment is deducible from it. Work at St. Andrew's Hospital, Northampton, showed that the blood cholesterol figure was higher in melancholia than in mania, and that there was a gradual increase with advancing years up to the age of 70 in both conditions. In the same institution the feeding of rabbits with cholesterol produced arterial disease due to deposition of the lipoid in the walls of the larger vessels, but the condition was not analogous to arteriosclerosis in man, the cholesterol being deposited only in the vessels nearest to the heart and in the cerebral vessels. Alcohol in large quantities had no effect in preventing the deposition of cholesterol *in vivo* in the rabbit. In a communication from the Staffordshire Mental Hospital at Stafford it is announced that cholesterol-ester is absent in the erythrocytes, and its ratio to the total cholesterol in the plasma in mental defectives averages 65 per cent. In several institutions the appearance in mental disease of phenyl ketonuria with the excretion of phenylpyruvic acid has been studied; the condition appears to be familial, and may be related to mental disorder in the involutional period of life.

Therapeutics

The widespread adoption of malaria therapy in general paralysis is shown by many communications. The Devon County Mental Hospital at Exminster mentions that quartan malaria has been successfully used to reinfect patients who had become resistant to benign tertian malaria, but that the incubation period may in some cases exceed one month. Regret is expressed that this line of therapy is not employed more often and more energetically in early cases of general paralysis, since the results have been so good and the improvement often better than when vaccines, physical pyrexia, and electricity have been tried as remedial agencies. At the Swansea Borough Mental Hospital cases of anxiety states due to stimulation of the parasympathetic system have been treated most successfully with choline preparations; it appears that a vicious circle is thus broken, and readjustment of the patient is made possible. At the Bristol City Mental Hospital prominal was substituted for gardenal sodium in the treatment of epilepsy with great improvement of the mental condition and reduction in the number of fits. This drug is also commended in the communication from the Norwich City Mental Hospital.

TREATMENT OF CARDIAC ISCHAEMIA

COLLEGE OF SURGEONS LECTURE ON FIRST RESULTS OF CARDIO-OMENTOPEXY

A special lecture was delivered at the Royal College of Surgeons of England on January 15 by Mr. Laurence O'Shaughnessy on the treatment of cardiac ischaemia, in which, after first dealing with experimental methods of initiating and supplementing reparative processes in coronary thrombosis and coronary sclerosis by the provision of an additional blood supply to the heart through grafts of living tissue, he described the operative technique and the case records of the first patients to be treated by cardio-omentopexy. Sir Cuthbert Wallace presided, and the large audience included most of the members of the Council of the College.

Viscount Dawson's Address

Viscount DAWSON, who gave a short introductory address, said that it so happened that he was the head of a small cardiovascular clinic established at Lambeth Hospital by the London County Council on the advice of Sir Frederick Menzies. The clinic had been equipped under the direction of the hospital superintendent, Dr. P. J. Watkin, and had the services of Dr. H. E. Mansell of Lambeth Hospital, Dr. Daniel Davies of the Royal Free, and himself, and the staff had co-operated with Mr. O'Shaughnessy in the excellent surgical work he was doing in the field of cardiovascular disease. It was only natural to suppose that a muscle which was unceasingly active from birth to death should need a big supply of blood if it was to be equal to the large amount of energy demanded; moreover, provision must be made for great changes in the requirements of blood and sensitiveness to deficiencies thereof. The anatomists calculated that during exercise the coronary arteries put out 1.4 litres per minute, representing a volume three times the size of the heart itself. As for quality, a fall of 50 per cent. in oxygen saturation of the blood would require the coronary flow to be increased fourfold by way of compensation. The findings of pathology accorded with these conclusions. Absence of nourishment of the heart, whether the result of a diminution in quantity on account of arteriosclerosis of the coronary tree, or of a diminution in quality by reason of lessened oxygen content, gave precisely the expected changes in the myocardium. Where occlusion was not immediately destructive of life the problem was to secure an adequate compensatory circulation. The difficulty was not in the anastomosis, but arose from the great vascular needs of the active heart. It was known that pericardial adhesions formed a most effective collateral circulation. Lord Dawson mentioned the work of experimentalists and clinicians on this and cognate points. In one reported case it was shown at necropsy that there had been complete occlusion of each coronary artery for a considerable time, and yet there had been no clinical history of any attack of coronary thrombosis; the pericardial adhesions had actually been supplying the heart. Such a compensatory circulation through the pericardium might sometimes form by itself, but if it did not, then surgical measures to establish it constituted a reasonable procedure. The prospect should be good in selected cases provided the capillary bed itself was not too degenerate to profit by the new arterial supply. Mr. O'Shaughnessy had acquired a high degree of skill in this field of constructive surgery.

Experimental Cardiac Grafting

Mr. O'SHAUGHNESSY, after referring to the ingenious methods employed by various workers to produce cardiac ischaemia in the heart of the experimental animal, and in particular the results recently published by C. S. Beck and V. L. Tichy in America of an experiment in which they had fashioned grafts from the pericardium, the omentum, and the chest wall, and put them on to the heart, said that his own experiments in cardiac grafting began at the research farm at Downe in 1933. In a previous paper, published in January of last year, he had described the first results of a series of grafts in the cat, and more particularly in the greyhound, showing that the presence of such a graft was compatible with the highest degree of physical exertion—in the case of the greyhound, of pursuing the electric hare with undiminished vigour. The greyhound was eventually killed to demonstrate that the anastomosis got better with time, and not worse.

The omentum was the only structure in the body with the specific property of vascularization. The practical importance of that fact was appreciated many years ago by Rutherford Morison. The operation of omentopexy had proved a good therapeutic measure in alcoholic cirrhosis, and Professor Grey Turner had given him notes of a case operated on thirty years ago, and the patient was still living. Even if it was agreed that omentopexy could not cure cirrhosis, the essential theoretical basis for cardio-omentopexy remained unshaken. Sir David Wilkie's early and complete experiments on the omentum gave an initial impetus to its use in surgery of the chest. Wilkie showed how in the cat the omentum could avert the diseases which normally followed ligature of all the vessels to the spleen. If the omentum could compensate for acute ischaemia in its natural media, there was no reason why it should not fulfil a similar function once it was given access to the thoracic cage.

The lecturer showed in successive drawings the technique of the operation whereby the omentum was brought up through an opening in the diaphragm, the myocardium opened and prepared for the reception of the graft, and the graft sutured to the surface of the heart. He also illustrated the results of one animal experiment which had been carried out with a view to putting a diaphragm graft on the heart. The animal was killed a month or two later, and the diaphragm graft could not be seen; all that could be seen was the omentum filling the left chest. A small opening had been left in the diaphragm, and the omentum had come forward to close that opening, which was its natural function, and had invaded the thoracic cavity.

Collaboration of the Physician

The school of thoracic surgery to which the lecturer belonged had always held that major interventions in the chest were only justifiable when there was close collaboration between physician and surgeon. It was not enough for the physician to refer a case; he must be in close contact with the patient in the immediate pre-operative period, and he and the surgeon must share the conduct of the post-operative period. Recent developments of radiological and other special methods had done nothing to invalidate that principle, which was naturally of very special importance before operation was contemplated on the human heart. Although the operation he described was devised in the College laboratory and its technique had been modified according to purely surgical contingencies, its actual performance had only taken place after the most careful consultation with the medical staff of the Lambeth clinic. In addition, the suitability of each

patient for general anaesthesia had been assessed. The elimination of post-operative shock had been possible in a large measure as a result of experimental work, but the successful conduct of the ten days following operation had only been brought about as a result of unremitting medical care.

The graft operated not only as a new blood supply brought into direct relation with the ischaemic area of the coronary tree, but the natural collaterals in the mediastinum were both reinforced and given access to the ischaemic heart. This second function of the graft was more important in man than in the animal, for the vessels surrounding the pericardium seemed to be in proportion much larger. It was obvious that deaths during the acute stage of coronary occlusion, either from general heart failure or from perforation of an acute infarct, could not be avoided by means of a graft, and it was only when the patient had survived these immediate perils that he could be considered a possible subject, and only then when the natural processes of repair were adequate. In every case of coronary thrombosis the fact must be faced that a second attack was likely; it might be postponed for years, but the exact time of its coming could not be predicted, and a favourable outcome of the second attack was only likely if the nature of the repair and compensation after the first attack had been efficient.

The interest of the surgeon was, of course, specially directed to cardiac aneurysm, one of the less common sequels of cardiac ischaemia. Although aneurysm of the heart was infrequent, the rarity of the condition should not be exaggerated, for in one year three cases came to necropsy in Lambeth Hospital. An aneurysm was the clearest evidence that the heart had suffered a grave vascular catastrophe. A second occlusion would either so limit the blood supply of the remaining cardiac muscles as to make them inefficient or there might occur a local necrosis of the aneurysmal sac with fatal perforation.

The First Six Cases

The indications for the operation of cardio-omentopexy were not very rigid. He and those associated with him had been guided in each case by two considerations. In the first place, they had demanded unequivocal evidence of cardiac ischaemia, and, secondly, they had proceeded to intervention only when it seemed that the immediate risks of operation were less than the patient must in any event run if his disease were allowed to pursue its natural course. He gave brief notes on six cases. The first was a man aged 64, operated on at Lewisham Hospital on January 4, 1936. Four others were aged 65, 72, 48, and 65, and were operated on at Lambeth. The sixth (age not stated) was operated on at Newcastle-on-Tyne General Hospital.

In none of the cases was there any immediate anxiety either during the operation or in the post-operative period. It was clearly essential before contemplating a major operation on the type of patient who suffered from cardiac ischaemia that the intervention should be so conducted that the disturbance of the normal physiology was as slight as possible; also that the factor of post-operative shock should be eliminated. The first essential was secured by the use of oxygen under positive pressure, and the elimination of surgical shock was due in the first place to the general anaesthesia employed, and also to the application of some findings on traumatic shock by Slome and himself in the College laboratory, when they had shown that the two factors connected with surgical shock were fluid loss at the site of trauma and nervous impulses generated in the traumatized area and transmitted for a considerable period. In the operation of cardio-omentopexy an approach was used which enabled an almost bloodless exposure of the heart, and no large vessels were divided.

It was the purpose of his lecture to demonstrate that cardio-omentopexy was a feasible operation attended with a low immediate mortality. A detailed report would be subsequently published by the medical staff of the clinic on the after-history of the patients. According to the experimental evidence, although vascular connexions were present and demonstrable within three weeks of operation, vascularization increased with time, and did not attain its maximum until at least a year had elapsed.

Immediate Results

One of the patients, seven days after the operation, died from haemorrhage due to a chronic duodenal ulcer, but no post-operative disturbance had been shown, the blood pressure was 130 mm., the pulse 80 per minute, and the respiration 20 per minute two hours after operation, and at necropsy everything in the chest was quite in order. The second patient left hospital in good condition. The third was able to get about very well. The fourth, whose age was 72, had a period of relief from angina, and was able to go home, but succumbed later to an attack of uraemia. At necropsy a chronic interstitial nephritis was found. The graft was quite firmly adherent to the heart. The fifth case was that of a patient who had been bed-ridden for eighteen months, and was now able to get up and walk about. The sixth patient had left hospital.

No post-operative complications had occurred. The temporary paresis of the diaphragm began to disappear after three months, and there was no case of diaphragmatic hernia among these six patients. He referred finally to the alternative operation suggested by Beck, in which a pedicle graft of the pectoralis major was sutured to the heart. He did not feel that the factors concerning shock could be so well controlled in Beck's operation as in cardio-omentopexy. In the Lambeth clinic it had been demonstrated that cardio-omentopexy could be performed without immediate distress even in a type of patient ill suited to most surgical operations, such as a man aged over 70 and a bed-ridden woman of 65. The graft fulfilled the immediate function of supplementing the blood supply to that portion of the myocardium still capable of function, and in an area so ischaemic as to have lost its active function it prevented further necrosis.

Mr. O'Shaughnessy concluded with several acknowledgements, principally to the Medical Research Council, the Council of the Royal College of Surgeons, Sir Arthur Keith, and Dr. John Beattie, as well as to his colleagues at Lambeth.

O. Henningsen (*Z. Urol.*, 1936, vol. 30, No. 11, p. 772) thinks that in prostatic hypertrophy there is in the first place an increase of the tonus of the vesical wall. This increases the resistance to the flow of the urine at the ureteral papillae. The back pressure is transmitted through the ureters to the kidneys. The tonus of the bladder wall does not depend on the filling of the bladder, but on the wall tension, and consequently on the intravesical pressure. The stimulation set up by chronic cystitis and by the hypertrophy of the bladder walls gives rise to an increase of tonus and to a decrease of the capacity of the bladder. This condition often occurs in prostatic hypertrophy in the absence of residual urine. The tension on the bladder wall can be partly relieved by a permanent catheter. But a more effective relief is obtained through a suprapubic cystostomy. Following this operation the kidneys may recover their function more or less completely.

Reports of Societies

MALIGNANT BONE TUMOURS

At a meeting of the Section of Radiology of the Royal Society of Medicine on January 15, with Dr. N. S. FINZI presiding, the subject for discussion was malignant bone tumours.

Dr. JAMES BRAILSFORD said that there were three lines of investigation of bone tumours—namely, the clinical, the histological, and the radiological, and a case in which any one of these had been neglected had not received adequate attention. In some cases only by a careful correlation of the findings of experienced observers in these three spheres would it be possible to arrive at an accurate diagnosis of the nature of the tumour. In other cases positive evidence would be obtained from either the clinical history, or the histology, or the radiology, the other methods supplying negative or even conflicting evidence. The positive evidence must always be allowed to dominate the ultimate conclusion. Radiography was the first court of appeal after the clinical examination, for it would often supply evidence of the nature of the lesion without undue delay or discomfort to the patient. Interpretation of the radiographs should not be attempted without a thorough knowledge of the clinical history of the lesion, for radiographic appearances, like clinical ones, could be similar in widely different conditions.

Radiological Features

The radiographic features were influenced by the nature of the tumour cells, the reaction of the adjacent normal tissue, the rapidity of the growth, the function and immobilization of the part, the presence of infection, and the exhibition of therapeutic measures, particularly radiation. Sarcomata and endotheliomata were the principal malignant tumours of bone, but malignant metaplasia was seen in certain simple tumours, traumatic lesions, chronic inflammatory lesions, and such conditions as osteitis deformans. The radiographic features of these tumours were simulated by carcinomatous deposits in bone, and must be distinguished from them. A classification based on the histological or fully developed clinical and radiological picture would not materially assist in the early diagnosis of malignant bone tumours. Such tumours in the early stage might produce either no change in the radiographic appearances of the affected bones but only perhaps some alteration in the appearance of the adjacent soft tissue, or an area of osteoporosis, or osteosclerosis with or without a periosteal reaction, or a diffuse change in the cancellous structure. The recognition of these slight changes would permit a suspicion of early malignancy, and it was probably only when this early detection brought prompt surgical measures that effective treatment was secured. In some cases the early radiographic features were characteristic even before the clinical findings warranted so serious a diagnosis and while the histological picture was still indefinite.

Early amputation of the affected limb appeared to offer the best chance of cure. Radiation therapy should certainly not be applied until a careful radiographic record had been obtained and the nature of the tumour determined, as it might mask the malignant nature of the lesion, and by staying the hand of the surgeon rob the patient of the chance of recovery. Radiation might somewhat delay the development of the tumour, but it did not stop the development of distant metastases, and therefore could not be said to effect a cure. Even in the so-called simple tumour of bone, the growth of which might be checked or abolished by radiation, there remained abnormal tissue at the site in which subsequent malignant metaplasia might occur. The reconsolidation of bone at the site of a localized carcinomatous metastasis following radiation therapy was probably the best palliative result of such radiation.

Osteogenic Sarcoma

Mr. W. H. OGILVIE confined his remarks to osteogenic sarcoma, by far the most important group numerically, accounting for more than 50 per cent. of bone tumours reported to the American Registry. Compared with malignant disease elsewhere it was appallingly fatal. In microscopical appearance there was great variation, for the growth derived from cells whose function it was to form bone, that function being exercised in varying degrees. Thus in osteogenic sarcoma there was a destruction of bone by tumour and new bone being laid down, in part by the effort of the malignant cells and in part by the effort of the periosteum to repair the damage. He was doubtful whether the division of these tumours into several subgroups, as was done by American writers, had any real pathological basis or clinical value. Osteogenic sarcoma presented a reasonably clear clinical picture. He discussed the cardinal diagnostic points. The great majority of these tumours occurred between the ages of 5 and 20. The patient was nearly always in excellent health at the time of onset. Pain was constant, early, and often the first symptom. The rate of growth was steady, noticeable from month to month, but not over shorter periods, contrasting with the slow growth of benign tumours and the rapid growth of inflammatory lesions. Nearly half the tumours appeared in the femur and a quarter in the tibia. Definite signs of inflammation were generally against a diagnosis of osteogenic sarcoma. Radiological observation was the first court of appeal, but clinical observations which should be made in a doubtful case included a Wassermann test, a careful examination of the blood, the taking of the rectal temperature, attention to any site of focal sepsis, and a trial of therapeutic irradiation, which, though without curative effect, relieved pain and caused shrinkage in size. The outlook was not quite so black as was sometimes supposed; he quoted from literature figures showing a five-year cure rate of 10 per cent., following treatment by amputation or local resection.

Classification and Nomenclature

Dr. R. W. SCARFF pleaded for a better co-ordination of nomenclature. Classification and nomenclature did not of themselves constitute knowledge, but it was essential that all the workers concerned should be discussing the same entity. He mentioned Ewing's tumour, on the separate existence of which some doubt had been cast. There was no unanimity about it, although Ewing first described it sixteen years ago. The speaker thought it a distinct entity, but one which might be simulated both clinically and radiologically by other conditions. Dr. J. DUNCAN WHITE showed radiographs of a doubtful case alike in its clinical, radiological, and histological aspect, the doubt being as between a chronic inflammatory process and a sarcoma. Dr. J. E. A. LYNHAM drew attention to the spicular or palisade appearance along the bones as seen in the radiographic picture. In his experience this was associated with chronic inflammatory disease, except in one case, which was a periosteal sarcoma of the tibia. The question of a biopsy had been mentioned, and objection had been raised as it was thought the taking of a section might encourage metastases. But the majority of patients died from metastases irrespective of whether a section had been taken or not, and the early taking of a section might lead to earlier amputation, with some prospect of cure. Mr. HOPE CARLTON called attention to the vagueness of the whole subject, and pleaded for dogmatism even at the expense of a certain amount of accuracy. Dr. GEORGE SIMON asked certain questions as to classification.

Dr. FINZI, from the chair, said that it was obvious that a satisfactory classification based on the pathology of the

tumours was very greatly needed, but it was to be hoped that no needless change of the terms in common use would be made. The terminology wanted clarifying rather than changing. Most speakers had pointed out the difficulty of histological diagnosis in these cases, yet many had insisted that such diagnosis should always be made. It seemed to him that in cases where the radiological picture was definite and the histological picture less certain, the radiological picture should be preferred. There were cases in which the radiologist made a mistake and the pathologist put him right, but he thought that statistics would show that quite as many mistakes were made by the pathologist as by the radiologist in these cases.

PROTAMINE INSULIN

At a meeting of the Section of Therapeutics and Pharmacology of the Royal Society of Medicine on January 12, Dr. DOROTHY HARE presiding, Dr. H. C. HAGEDORN of Copenhagen delivered an address on protamine insulin.

Dr. Hagedorn said that the great discovery of insulin had made it possible for sufferers even in the more severe cases of diabetes to live and work almost like normal persons. A small number of cases remained, however, in which entire success could not be obtained, while difficulties were experienced in timing the effect of insulin. Attempts had been made to prolong this effect in different ways; at present the injection of insoluble compounds of insulin seemed to give the best results. The use of the protamine insulin compound had been encouraging. Dr. Hagedorn entered somewhat deeply into the chemistry of the subject, taking "salmiridin"—a monoprotamine from *Salmo irideus*—and discussing its quantitative relation with insulin, and the influence of concentration, *p*H, and other factors. Protamine insulin was stable under ordinary circumstances for many weeks and in cold storage for months. Originally the name given to it was "protamine insulinate," to suggest that the protamine acted as base and the insulin as acid, but it might be preferable not to make such an assumption and to call the material simply "protamine insulin."

Clinical Trials

Coming to the clinical experiences, Dr. Hagedorn said that before bringing protamine insulin into general use a few cases were treated over a period of a year and carefully watched for the appearance of unexpected difficulties. The statement that some patients did well on a new treatment might be very encouraging for them and for their doctors, but it was far from being clinical evidence. For this purpose all the conditions must be arranged as for a scientific experiment with controls. He exhibited a number of graphs relating to typical cases treated with protamine insulin, either alone in one or two daily doses or combined with ordinary insulin, which was given in the morning, the protamine insulin being given in the afternoon. Sometimes combined preparations of ordinary insulin, protamine insulin, and zinc protamine were used. Very encouraging information was obtained from the patients or their relatives stating that they felt better and were less tired, especially in the hours when the blood-sugar values were lowest or highest. In the larger number of cases in which considerable oscillations in the blood-sugar curve were noticeable, an improvement was obtained. In three cases complicated with Graves's disease not only was control of the diabetes secured, but the Graves's disease was ameliorated. Dr. Hagedorn concluded by saying:

"It has been most impressive with many patients, both children and adults, who used to have several periods in hospital each year, being brought there either in a hypoglycaemic or semi-comatose state, to find them coming to hospital no longer. We have had only one admission due to hypoglycaemia, caused by a very big overdose being taken during alcohol intoxication! In another case coma developed during influenza, and the patient was brought to hospital with double pneumonia. Having been delirious for ten days, after taking an average of 240 units a day he finally recovered. It appears that the dose of protamine insulin can be reduced to the extent of 15 per cent. compared with ordinary insulin. But we must not forget the other side. It is not in every case that we succeed in keeping the blood sugar within reasonable limits, and at present we are not able to say with certainty in which cases this can be done. According to hitherto unexplained individual differences, most likely in resorption from subcutaneous tissue, some cases are found which do not react to the protamine insulin in the typical way."

British Experiences

Dr. OTTO LEYTON, after a compliment to Dr. Hagedorn, who, he said, was one of the first to produce insulin in Europe, and had conferred a further boon upon the diabetic by changing his life from one of hazard to one of comparatively even tenor, described his own experiences with the preparation with which he had been supplied by Dr. Hagedorn for quite a considerable time. He warned those who worked with protamine insulin that perhaps chance might arrange that the first few cases in which it was tried would not yield successful results. But it should be continued, and eventually it would be found that between 60 and 70 per cent. of cases reacted well. He had been using protamine insulin in some cases in a single daily dose, and when the diabetes was not severe this procedure had proved in many cases very successful. Naturally the diet was altered. Instead of distributing carbohydrate in the ratio of 40 per cent. at the two meals which were preceded by insulin, about 35 per cent. of the carbohydrate was given at breakfast—that is, one or one and a half hours after the injection of the insulin—50 per cent. at lunch, 10 per cent. at tea, and 5 per cent. at the evening meal. No hard-and-fast rules could be laid down, but something of that kind often succeeded when 40 units of insulin were required daily. Another use of protamine insulin was in cases which were slowly improving. Some patients continued to improve over a long period if the sugar content of the blood was kept low throughout the twenty-four hours; and when, say, 12 units of insulin (6 units twice daily) were being taken one could not suddenly change the regime and give it all before breakfast, but one could change to 12 units of protamine insulin and then gradually diminish, and in some cases finally discard. At the London Hospital some observations had been made to determine whether there was any difference according to the site at which protamine insulin was injected. The difference in the few cases in which it had been tried was not sufficient to justify any real conclusion, but it was thought that by injecting into a mass of fat the action might be longer, and the effect had even been tried of injecting some of the precipitate intravenously when there was very considerable retardation in action. The problem of why in some people protamine insulin acted very rapidly probably engaged the attention of all interested in diabetes. It would be interesting to know whether in such cases some other precipitate of insulin acted rapidly also. He could only confirm what Dr. Hagedorn had said—that at present no one could predict definitely how the preparation would act. In every patient careful observation had to be made to ascertain whether the action was rapid or long delayed; in a few cases it seemed to be so long delayed as not to be recognizable at all.

Use in Children

Dr. W. W. PAYNE said that he had noticed in patients put on protamine insulin that they were less easily upset by the ordinary troubles of life. Although he had found it difficult to keep children—among whom his work principally lay—completely sugar-free on one or two doses of protamine insulin, in practically every case there had been a marked improvement in their feeling of well-being and their capacity for work and enjoyment. He had

tried to keep them on one dose a day wherever possible. When this was done the blood sugar usually rose between meals and fell again when the meal was taken, and after supper it fell and they remained sugar-free until the next morning. He had spread out the carbohydrate over all the meals and still got a sugar-free night in most cases. He pleaded for a stronger solution. The 60 or 70 units necessary for the one-dose treatment was a very large dose for small children.

Dr. GEORGE GRAHAM had found the preparation helpful in the case of people who swung very quickly from a high blood sugar in the morning to an overdose in the middle of the day and high blood sugar again in the evening. He agreed with Dr. Payne as to the need for a stronger solution. He hoped it would be possible also to produce a quicker-acting insulin for the sake of the diabetics who during a prolonged life would get worse and want insulin at least three times and perhaps oftener a day.

Dr. T. IZOD BENNETT said that he had been using protamine insulin on a series of children at Middlesex Hospital for many months, and in every case he had been able not only to diminish the total amount of insulin employed, but the number of injections given, though in only one case was the number brought down to one a day. The other children were having two injections a day, and in the majority of cases it had been possible to abolish the glycosuria present in the morning at breakfast. He had experienced difficulty with reactions, but these were less violent than with ordinary insulin. He agreed with Dr. Payne with regard to the change of temperament in children, but that was only another way of stating that the patient who was successfully treated with protamine insulin had less frequent phases of hypoglycaemia, and in consequence was a very different person from the standpoint of general health and mental irritability. Often these patients had spoken of their increased feeling of well-being when these hypoglycaemic attacks, often so slight as to be unrecognizable, had been abolished. The introduction of these substances was going to make the work of the physician more difficult, and with a view to keeping practice within the bounds of reasonable facility he had never treated any patient with two different forms of insulin simultaneously. There must be great potential danger to the patient who got one sort of insulin in the morning and another sort at night. He could not have that for many years without accident, and that was a practical point which those employing insulin should constantly bear in mind. But these slow insulins had undoubtedly come to stay, and those employing them clinically should make every endeavour in each case to employ one kind of insulin, changing over to another if necessary, but not using several different forms of insulin at the same time. Another difficulty was that of assessing dosage. Protamine insulin could no more be measured in terms of international units than, say, adrenaline could be measured in the terms of pituitrin. The substances had different actions, and so the same standard could not be applied to all of them. This would create difficulty because it was open to any manufacturer to place on the market any of the new insulins and leave it to the clinician to work out what the dose should be. He hoped the British manufacturer would walk a little less in the rear of his competitors in other countries. Protamine insulin, zinc insulin, and so-called crystalline insulin were appearing from abroad, and so far the British manufacturer was "watching with reverence and still turning out the excellent insulin we have been using until the last year or two. That, I think, is to be deplored from the national point of view."

Conclusion

Dr. HAGEDORN said that he thought it might be possible to use a stronger solution. One dose a day was the ideal, and it could be carried out in hospital, but with more difficulty at home, and he thought it well to be cautious and not go too far in the one daily dose direction. In fact the whole question called for caution. An American had said that patients suffering from severe diabetes were sailing unknown seas, and it might be added that those responsible for their treatment were in the same boat.

Mr. F. H. CARR as a British manufacturer desired to say a word in reply to Dr. Bennett's criticism. The British manufacturers were working together at this moment with a view to meeting exactly the requirements of the Medical Research Council and the medical profession in respect of insulin. They had been working intensively in recent months, and some practical issue might be expected before long. There was, however, a patent for the manufacture of protamine insulin, and except by the kindness of Dr. Hagedorn or by means of opposing that patent British manufacturers would not be free to make protamine insulin.

ALCOHOL AND MOTOR ACCIDENTS

At a meeting of the Society for the Study of Inebriety held on January 12 Dr. H. M. VERNON opened a discussion on "Alcohol and Motor Accidents." He pointed out that though road traffic accidents had, during the last two years, receded a little on the maximum observed in 1934, the fatalities still averaged eighteen a day and the injuries over 600. Half of the fatalities were incurred by pedestrians and a fifth by pedal cyclists, while drivers of motor vehicles and their passengers experienced only a third to a fourth as many accidents as pedestrians. The Ministry of Transport attributed considerably fewer of the fatalities to drivers than to pedestrians, but estimates made in France, Holland, and America assigned from 67 to 80 per cent. of them to drivers.

Of the various individual causes of fatal accidents speed appeared to be the most important. The Ministry of Transport considered that of the fatalities attributed to drivers in 1935 a fourth were due directly to excessive speed, but many of the other causes tabulated were due in some degree to this cause—for example, the 112 fatalities due to "overtaking improperly," the 114 due to "swerving," and the 186 due to "failing to keep to near side." The Ministry's data for 1933 showed that private cars and motor cycles incurred their largest proportion of accidents when travelling at a speed of 20 to 40 miles an hour, while vans, lorries, and public conveyances incurred their largest proportion at a speed of 10 to 20 miles. Now it had been estimated that on an average vehicles of these latter classes travelled eight to sixteen times further than motor cycles before causing a fatal accident, and two to three times further than private cars, so there seemed to be a close relationship between speed and likelihood of accident. In Berlin it was found that when in 1927 the speed limit for lorries and taxi-cabs was suspended accidents of all kinds (including collisions) increased two- to three-fold; but the rules governing the speed limit of private cars were not altered, and it was found that in their case the number of accidents increased only 3 per cent. Converse evidence was obtained in Rhode Island, U.S.A., for when the average speed was reduced from 37 to 31 miles per hour the fatalities were reduced 27 per cent.

Alcohol and the Speed Factor

The importance of the speed factor was emphasized by Dr. Vernon because of its relation to the effects of alcohol consumption on drivers. The special committee of the British Medical Association on "The Relation of Alcohol to Road Accidents" reported in 1935 that moderate quantities of alcohol, such as 34 c.cm., or the equivalent of three ounces of whisky, had been shown by psychological tests to diminish attention and control and to reduce the rapidity and accuracy of co-ordination with which movements of the eyes, hands, and legs were

made. The alcohol must therefore, in the opinion of the committee, "frequently affect the driving capacity of the driver," and "this adverse effect generally occurs even if alcohol is taken in moderate quantities some hours before driving." It was evident that the adverse effects were more likely to lead to an accident the greater the speed of driving. The influence of a small error of control became magnified in direct proportion to the speed, while the distance within which a car could be pulled up when a pedestrian or other possible obstruction was seen varied as the square of the speed. Allowing for the "reaction time," it was calculated that at a speed of 50 miles per hour the stopping distance was 149 feet, but careful tests showed that this reaction time was increased by at least a tenth of a second after a moderate quantity of alcohol is taken, and this would mean an increase of seven feet in the stopping distance. However, complex reactions might be lengthened by as much as 0.37 second, and this time interval corresponded to twenty-seven feet of road space in a car going 50 miles an hour. Alcohol had the additional effect of causing drivers unconsciously to accelerate their speed. Tests were made by the lecturer at the National Institute of Industrial Psychology by means of the motor driving apparatus set up there. The apparatus consists of a dummy car with the usual form of steering wheel and foot levers. In front of the driver is a screen, on which is projected a moving picture of a road, along which the subject of experiment can drive the car in any direction he likes. Experiments were made on twenty subjects, who did three driving tests before drinking the experimental dose of alcohol and three further tests at intervals of one-half to two and a quarter hours after it. The drink consisted of 2¾ oz. of whisky, containing 32 c.cm. of alcohol, or of mild beer, containing 5 c.cm., and it was found that in the whisky experiments, as contrasted with the beer experiments, the subjects drove on an average 6 per cent. faster but they made 13 per cent. more errors in keeping to the track. In a third of the tests the reduction in the time required to drive round the track ranged from 10 to 25 per cent., and an acceleration of this sort, which was usually made quite unconsciously by the subjects, indicated the importance of all cars being compulsorily provided with a speedometer.

Clinical Symptoms in Relation to Alcohol Concentration

The data adduced by the Ministry of Transport indicated that only 1 in 80 of the fatalities attributed to the various road users were due to the persons concerned being obviously "under the influence of drink or drugs," but evidence from America suggested that alcohol played a much larger part than this in motor accidents. It was stated that though alcohol was directly mentioned only in 7 to 10 per cent. of the fatal traffic accidents the traffic commissioners and other informed individuals believed that probably a third or a fourth of the motor accidents were partly attributable to the consumption of alcohol by the drivers. Again, the records of our own police courts showed that in 1934 no fewer than 2,016 drivers of motor vehicles were certified by the examining doctor to be under the influence of drink to such an extent that they were "incapable of proper control of a vehicle." A new and more exact method of obtaining evidence on this very difficult problem was now being investigated, and was found to throw a flood of light upon it. It was based on the determination of the alcohol content of small samples of the blood or urine taken from the driver soon after an accident had been incurred. In Widmark's micro-method of analysis only two drops of blood were required, and estimates made by several independent investigators showed a rough correspondence between alcohol concentration and clinical symptoms. Of the persons having 1 part of alcohol per 1,000 in their blood from 40 to 63 per cent. were found to be "under the influence"; of those with 1.7 parts from 80 to 88 per cent. were so affected, and of those with 2 parts the whole were so affected. With regard to the blood analyses made on persons involved in motor and train traffic accidents, two Swedish investigators, Hindmarsh and Linde, found that thirty-three out of the 113 persons tested had more than 1 part of alcohol per 1,000 in their blood. Heise in America found that of 119 drivers involved in motor accidents eleven had 1.4 to 3.5 parts of alcohol per 1,000 in their blood, while seventy-four of them, or nearly two-thirds of the whole, had more than 0.2 part. Analyses by Jungmichel of the blood of 298 persons involved in traffic accidents in Munich showed that only 8 per cent. were practically alcohol-free; 15 per cent. had 0.04 to 1 part per 1,000; 39 per cent. had 1.01 to 2 parts; and 37 per cent. had 2.01 parts or more. The frequency with which large amounts of alcohol were found in the blood was due to the fact that the police had compulsory powers to take blood samples in cases of accident; but apparently they exercised these powers only when they suspected alcohol as a causative factor. The numerical data quoted went to show that in the great majority of cases their suspicions were well founded.

Practical Inferences from the Data

It would be noted that in the large majority of blood samples analysed in Sweden and in America the blood was found to contain less than 1 part per 1,000 of alcohol, so it might be thought that the skill of most of the drivers concerned was not affected; but this was by no means the case. W. R. Miles found, as the result of tests on nine subjects, that after drinking the equivalent of 3 oz. of whisky in concentrated form the blood alcohol rose to a maximum of 0.4 per 1,000, and when taken in a dilute form to 0.3 part per 1,000. Again, Schmidt found that when the equivalent of 3.7 oz. of whisky was given to forty-four students and chauffeurs their blood alcohol rose to a maximum of 0.6 part per 1,000, the maxima in individual cases ranging from 0.4 to 0.8 part. Since the psychological tests previously cited indicated that 3 oz. of whisky or its equivalent had adverse effects on driving capacity, it followed that such effects were usually present to some extent in drivers found to have more than 0.3 part of alcohol in their blood, in spite of the fact that no symptoms of being "under the influence" were detectable by the methods of medical examination usually employed. This conclusion led logically to the view advanced by the *Times* in a leading article when it said: "As things stand at present there would appear to be no absolute safeguard for the motor driver but total abstinence." Such abstinence should be practised for several hours before driving, as well as during its course, for the rate of disappearance of alcohol from the blood is very slow. It is got rid of—mostly by oxidation—at the rate equivalent to only 1 oz. of whisky per hour in a man weighing 11 st.

International medical post-graduate courses in Berlin during 1937 include the following: internal medicine, from February 22 to March 6 (fee, RM.75); additional training course for surgeons, from April 5 to 10 (fee, RM.70); additional training course in industrial diseases, from April 5 to 10 (fee, RM.50); special course in urology, from April 12 to 17 (fee, RM.60); diet in health and disease, from April 12 to 17 (fee, RM.50); *x*-ray diagnosis and treatment, from April 16 to 23 (fee, RM.60); additional training course in orthopaedics, from April 19 to 24 (fee RM.60); tuberculosis, from May 3 to 8 (fee, RM.50); and an additional training course in homoeopathy in two parts, from April 5 to 30 (fee, RM.75 for the whole course). These courses are given in German, but special practical courses in other languages will also be held each month in all branches of medicine, with clinical and laboratory work. For programmes and further information application should be made to the Geschäftsstelle der Berliner Akademie für arztliche Fortbildung, Robert Koch Platz 7, Berlin, N.W.7.

Local News

ENGLAND AND WALES

A Veteran Medical Charity

At a meeting of the court of the directors of the Society for Relief of Widows and Orphans of Medical Men, held on January 6, with Mr. V. Warren Low, president, in the chair, six new members were elected and one death and one resignation were reported. From the ordinary funds £1,540 was voted, and from the Brickwell Fund £541 5s. for the payment of the half-yearly grants to the fifty-nine widows and nine orphans in receipt of relief. A widow of a deceased member was voted an annual grant of £50 from the ordinary funds and £10 from the Brickwell Fund. A sum of £640 was distributed in December as Christmas presents, each widow receiving £10 and each orphan £5, in addition to their ordinary grants. In 1938 the society will celebrate the 150th anniversary of its foundation. Membership is limited to registered medical men who at the time of their election are resident within a twenty-mile radius of Charing Cross. After election they may remove beyond this radius, but still retain their membership. The annual subscription is two, three, or four guineas according to age at the time of election. Relief is only granted to the widows and orphans of deceased members. Full particulars and application forms for membership may be obtained from the secretary at 11, Chandos Street, Cavendish Square, W.1. He attends there, should a candidate desire an interview, on Wednesdays and Fridays between 4 and 5 p.m.

The Midwifery Service

The annual report of the Central Midwives Board for the year ended March 31, 1936 (H.M. Stationery Office, 2d.) shows that on that date there were 62,064 women on the midwives roll, a net increase of 3,100 on the total for the previous year. Only a little more than a quarter of the total number of qualified midwives are actually engaged in the practice of their profession—the number practising during 1935 being 16,165. Over the whole country three out of every four candidates who sat for the examination in midwifery during the year were successful, but the proportion varied in different examination centres—four out of five passed at Newcastle-upon-Tyne, but only two out of three at Liverpool and Manchester. The report states that during the year the Board proceeded further with the revision of the training and examination rules, and, after the close of the year, approved the final draft of the new rules which has since been submitted to the Minister of Health. The report includes notes of interesting decisions given during the year on midwifery etiquette and practice, and a warm tribute is paid to the services of Dr. J. S. Fairbairn, who took an active part in the Board's deliberations throughout his membership from 1918 to 1936 and was chairman during the past five years. Admiration is expressed for "the immense efforts which he made to improve the status of midwives and midwifery in this country."

Coming of Age of Star and Garter Home

The twenty-first anniversary of the Star and Garter Home for disabled sailors and soldiers has just been celebrated. In the early part of 1916, when the pressure of war casualties made it necessary to evacuate from the war hospitals paralysed patients who appeared to be incurable, a temporary hospital of sixty-five beds for their use was installed in the banqueting hall and ballroom of the Star and Garter Hotel, then derelict, overlooking the Thames at Richmond. The hotel was purchased as a hospital, largely as a result of a public appeal by the Auctioneers' and Estate Agents' Institute, and presented to Queen Mary as the foundation of a permanent home for paralysed and disabled ex-service men. The British Red Cross Society was entrusted with the duty of carrying out the scheme, and after the war the hotel buildings were pulled down and the present beautiful home erected on the site, the funds being subscribed by the women of the Empire as their war memorial. In its early years the home admitted only victims of the war, but it is now open to all disabled ex-service men except those suffering from certain specified diseases. At present 186 patients are being cared for, and the waiting list of applicants is larger than ever before. At the celebration of the coming of age a message was read from Queen Mary as patron of the home, saying that she rejoiced to think that so many of the men disabled in His Majesty's service had found on Richmond Hill a happy and comfortable home, and had been spared so much suffering and distress that might otherwise have been their lot. The need for continued public support was voiced by Air Marshal Sir John Salmond, president of the home, and Sir Arthur Stanley, chairman of the governors. The home, with its seaside branch at Sandgate, costs some £48,000 a year to maintain, and some of the patients can make little or no contribution to their maintenance. Sir Arthur Stanley mentioned the debt of thanks owing to Sir Edward Cooper for his gratuitous work in designing the home and supervising its building.

SCOTLAND

New Aberdeen Professor

As briefly recorded on another page, Professor John Stirling Young has been appointed to the vacant chair of pathology in the University of Aberdeen in the place of Professor Theodore Shennan, resigned. Professor Young graduated M.A. at Glasgow in 1919, B.Sc. in 1921, and M.B., Ch.B. with honours in 1923, proceeding to the M.D. with honours in 1929. During his course at the University of Glasgow he gained the Brunton Memorial Prize in 1923 and the Bellahouston gold medal in 1929. After holding resident posts in the Western and Royal Infirmaries of Glasgow he became assistant to the professor of pathology and assistant pathologist at the Western Infirmary in 1924. In 1927 he was appointed reader in experimental pathology and assistant director of cancer research in the University of Leeds, and in 1932 he became professor of pathology in Queen's University, Belfast, a post which he still holds. He has made numerous contributions to the literature of his specialty.

Physical Fitness in Scotland

In an address to the Edinburgh City Business Club on January 12 Professor P. S. Lelean of the department of public health in the University of Edinburgh drew attention to a deplorable loss of fitness in Scotland. He said that maternal mortality was the keystone of a nation's health, and in Scotland the maternal mortality rate last year had been 50 per cent. above that in England, while it was double that of Holland. In fourteen countries of Europe the infant mortality rate was lower than it was in Scotland last year, and in England it was only 75 per cent. of that in Scotland, although in 1900 the English figure had been worse than the Scottish. Another fact was that out of 100,000 school children examined in 1934–5 in Glasgow, 93,000 were defective, of whom 87,000 were suffering from remediable defects. In order to assess the health of adolescents one might take the recruiting figures which bore upon the age of 18. Last year, out of 80,000 young men who presented themselves for recruiting, 37,000 were rejected at sight and another 17,000 on medical examination, or, in other words, two out of every three were rejected. With regard to persons insured under the National Health Insurance Act, on an average each worker was off work eleven days in a year, and one out of every five was incapacitated for seven

weeks in a year, while the number of persons sick reached the huge total of 395,000. Under the Unemployment Insurance Act of 1934 there was power to arrange for and compel attendance at physical training classes for the unemployed, but these powers were not being used. Young men were loafing around the street corners with their hands in their pockets, and they had not the instinct of physical fitness. In order to create this there must be a thirst for physical fitness at an early age. Some people would rather that a man should be unfit than that he should become fit with the possibility of ever being called upon for patriotic service. There was a contrast with Germany, where 400,000 recruits of the 1920 class were called up, and 80 per cent. of these had been found fit for front-line service. Germany, with her system of physical training, was therefore passing four recruits out of five, as compared with the rejection of two out of three in this country. Professor Lelean urged that more playing fields should be provided, and suggested that national physique might be improved by making it a condition for drawing unemployment pay that young men should attend summer camps for six months.

Maternity Work in Glasgow

The medical report for 1935 of the Glasgow Royal Maternity and Women's Hospital is lucid and informative, reflecting credit on its compiler, Dr. M. D. Black, the registrar. This institution is the largest purely maternity hospital in the country. Of its 175 beds, seventy-eight are reserved for ante-natal and seventy-eight for lying-in patients. Nineteen beds are set aside in a separate isolation block for "suspect" cases. Each of the assistant obstetric surgeons takes charge of this block for a period of four months, and during his tenure of this office he has no dealings with patients in other parts of the hospital. The same restriction applies to the special house-surgeon who works under him. The hospital treats a large number of abnormal cases, totalling 68.5 per cent. of all admissions in the year under review. This is attributed in part to the high incidence of rickets in the population served by the institution. In classifying cases it is stated that the simple division into "booked" cases and "emergencies," as suggested by the committee of the Royal Society of Medicine, is not easily applicable at this hospital. The scheme has therefore been modified, and indoor patients are divided into Category A, comprising those who were under ante-natal supervision at the hospital clinic and who had attended on at least two occasions shortly before admission; and Category B, including all other patients: 57.7 per cent. of admissions during the year belonged to the latter category. It is stated that a considerable amount of research work on infections of the urinary tract, puerperal fever, and the toxaemias of pregnancy is being carried out by members of the medical staff.

B. Frattini (*Arch. Ist. biochim. ital.*, October, 1936, p. 251) has studied the preventive and curative action, in experimental infection of rabbits with a Type II pneumococcus, of fractions of the products of autolysis of the bacterium concerned. A product of prolonged autolysis, from which the pyrogenic factors have been excluded by dialysis, was found extremely active in experimental infections of rabbits, leading to recovery in 96.6 per cent. of animals which had received an injection of a culture which was otherwise lethal within twenty-four to forty-eight hours. There was no pyrexia. It would seem that the curative action of the injection was due to destruction of bacterial virulence: pneumococci isolated by blood culture from the surviving animals were avirulent for others, but the blood of the former contained no protective antibodies. The protective fraction of the dialysate seemed to be specific: one prepared from staphylococci was ineffective in treatment of pneumococcal infections.

Correspondence

Nutritional Anaemia in the East End of London

SIR,—I welcome the criticism by Dr. Helen Mackay (January 16, p. 140) of my communication on haemoglobin and red cell estimations in children, not only because Dr. Mackay has done so much work on the same subject herself, but also because her own observations were made in children resident in the East End of London.

Regarding the technique employed for obtaining the blood, I may say that a sharp lancet-shaped Hagedorn needle was used so that a satisfactory incision with a free flow of blood resulted. It may be for this reason that I personally have never obtained the great differences between blood from ear and heel punctures recorded by Drucker and apparently also observed by Dr. Mackay. For the most part the differences I have observed have been within the range of experimental error. Moreover, if such a variation in the haemoglobin content of the ear blood, as Dr. Mackay suggests, was a common feature, I should have expected a much wider spread of the individual estimations than is revealed in the curve. A really wide spread of the estimations was only observed during the first few months of life.

Dr. Mackay raises the further question of the standard of normality which I have taken. I venture to think that the more rational standard is the level present in the average healthy child and not the highest level to which the haemoglobin can be forced by artificial means. I might say in passing that I have found it very difficult to increase the haemoglobin content of the healthy child by the administration of iron. In any case it seems to me that the admission of such a principle not only implies that nature does not know how to provide for the needs of the growing infant, since Dr. Mackay considers the haemoglobin content even of the breast-fed child unduly low, but it would necessitate a reconsideration of the normal standard of other substances in the blood—for, example, calcium.

And finally, whether or not the height of the haemoglobin is a measure of the resistance of the individual, I think there can be no doubt that it is not a measure of the health of the individual. I always remember that many years ago, when I was studying the blood in rickets, I found that the rachitic children on the average gave definitely higher readings of both haemoglobin and red cells than were obtained in my own and my colleagues' healthy and very often rosy-cheeked children, who were used as controls.—I am, etc.,

London, W.1, Jan. 16. LEONARD FINDLAY.

Appendicostomy in Acute Appendicitis

SIR,—For some years past when performing appendicectomy in cases where much peritonitis was present I have adopted the simple expedient of inserting a rubber catheter through the base of the amputated appendix and fixing it into the caecum by a purse-string suture. It does not add appreciably to the time taken for the operation, and it usually enables one to dispense with a drain. Any pus which subsequently forms will readily escape from the wound alongside the catheter. Glucose and saline solution is administered by the slow-drip method and is rapidly absorbed from the large bowel,

thus avoiding the need for intravenous infusion. Fluids can be given in this way, either continuously or intermittently, for days if the condition of the patient demands it. When the catheter is removed the wound heals normally and without the formation of a faecal fistula. I have found that patients treated in this way usually make a remarkably rapid recovery and that they suffer less from intestinal distension than do those in whom appendicostomy has not been performed.

I make no claim for originality in this treatment, which has, I know, been adopted by other surgeons in this country and abroad. It is, however, a method which seems to be comparatively little known and which certainly does not enjoy the popularity which it deserves. I feel sure that its more general adoption would save the lives of many of our most desperate cases, and I hope that this note may encourage others to give it a trial. —I am, etc.,

HUBERT CHITTY,
Honorary Surgeon, Bristol Royal Infirmary.

Bristol, Jan. 13.

Serum for Influenza

SIR,—The letter on this subject from Dr. A. H. Douthwaite and Dr. F. A. Knott interests me greatly, for it deals with a subject which I opened up during the pandemic in 1918.

The question of specific therapy was one that could not fail to suggest itself to anyone who approached the subject with an inquiring mind, and particularly to those who appreciated the earliest cases seen in the epidemic. It is in these early cases that the disease is seen to run its true and uncomplicated course; in these early cases the duration was a few days, with rapid recovery and an immunity of some indefinite duration.

In a brief survey of the epidemic in Macedonia (Burnford, 1919) I stated:

"Our treatment must be based on the hypothesis that the condition is one of toxaemia which leads to production of antitoxin . . ." and again ". . . with the growing conviction that the essential process was one of toxaemia, attention was directed to serum therapy, and we had in mind the idea that in the blood of convalescent patients would be found the antitoxin itself, and we are still of this opinion. Unfortunately various difficulties presented themselves, and it was not until the end of the epidemic in the Dardanelles that we found an opportunity of putting these ideas into practice, and then only in one case. The patient was gravely ill, and indeed we had seen no other case of such gravity ever recover. But he was given serum from several picked convalescents and slowly improved. . . . This case is put on record as suggestive and also as a proof that the use of serum was at least harmless, an essential factor in initiating further investigation on these unconventional lines. . . ."

Recognizing the much greater difficulties experienced in civil practice of carrying out such treatment I have often regretted my lost opportunities of testing out this idea on a large scale. Hence I welcome the reappearance of the idea in your columns.

If memory is not playing me false I think the treatment was actually carried out on a larger scale in the smaller epidemic which followed in about 1921 by observers in Australia and published at about that time. Again, trusting to memory, I think the results were promising.—I am, etc.,

JULIUS BURNFORD.

London, W.1, Jan. 18.

REFERENCE

Burnford, J. (1919). *Proc. roy. Soc. Med.*, **12**, Sect. of Med., April 29, p. 49.

Analysis of Clinical Statistics

SIR,—Mr. I. A. Tumarkin's letter in the *Journal* of December 12, 1936 (p. 1229) may appear to have cast such doubt on my article on problems of chance in clinical work (August 1, 1936, p. 221) that those readers who already look askance at statistical methods may have been confirmed in their views, while others, previously undecided, may have been convinced that such methods are unsuitable for ordinary clinical material. It would be unfortunate if further misconceptions were introduced where misunderstanding is already so common, especially since Mr. Tumarkin's letter justifies rather than controverts the purpose and results of my article.

It is regrettable that Mr. Tumarkin should consider my article as a special criticism of his work (March 21, 1936, p. 580) rather than as a general discussion, but for any such discussion the choice of an example from an actual investigation, so as to avoid lack of reality, may suggest an *argumentum ad hominem*—a suggestion which I endeavoured so far as possible to eliminate. If I had been discussing Mr. Tumarkin's investigation as such I should, of course, have proceeded to the comparison of samples (cures and failures in facial paralysis) without discussing at any length the estimation of odds. Mr. Tumarkin's work appears to be of high practical value, and it is in the tentative stages of such work that simple and well-founded tests, often used in some other comparable branches of investigation, are desirable, partly because they enable one to distinguish results that could reasonably be attributed to chance, and so to follow the indications that are likely to be most profitable, thus economizing time, effort, and financial outlay.

With reference to the "simple error" into which he considers I have fallen, Mr. Tumarkin's letter states that "the statistician in analysing a problem of which he has no *clinical* knowledge is liable to overlook certain factors." This was fully emphasized in my article, but has no bearing on the so-called "error," for, even to the eye of an anatomist, it was clear that the failures of cure in Bell's palsy in Mr. Tumarkin's table were more abundant than usual, and Mr. Tumarkin had reasonably explained this by supposing that more cured patients than failures had omitted to reply to his questionary. Mr. Tumarkin's table showed the information from the available samples, and the lines that immediately followed the table read: "Stated simply it may be said that if the patient has both pain and loss of taste the chances are 2 to 1 . . .," odds considerably at variance with those indicated in the table itself. It was therefore natural to suppose that the author intended to calculate the odds from the available samples and to let his statement regarding unanswered questionaries indicate that if these had all been answered the odds in favour of cure would very likely have been greater—a very satisfactory form of argument. There was surely, therefore, no need to write to the author before I made such statements as: "The chances of cure in such cases, so far as they can be estimated from this sample, are eighteen out of twenty . . ."; or before making the suggestion, for example, that "the odds of 2 to 1 . . . seem to have been derived from a consideration of the eighteen failures. . . ." This suggestion was not of "elementary mistakes in arithmetic," but of comparing inappropriate data in the table. It was surely not so uncomplimentary to suggest a technical error in the estimation of odds (a procedure not in daily use) as to suggest that an author, presenting data and ideas for the use of others, had (1) without informing the reader introduced

a multiplication by three, which alters a proportion from 18:2 to 54:2; and (2) stated definite odds based on assumptions regarding the patients (about half of the total) who did not reply. My "error," therefore, lay in not attributing the discrepancy to the causes (1) and (2). Mr. Tumarkin gives three reasons for (1), two of which have been discussed above. The remaining reason, a desire to avoid confusing the article with mathematics, appears hardly valid when two lines of his letter sufficiently indicate the nature of the alteration. As regards (2), however reasonable it may be to suppose that the majority of the patients who did not reply were cured, it is not legitimate, from all the intrinsic and extrinsic evidence, to make anything more than a general statement, such as given above, regarding the change in odds that might be expected if all patients had replied. The reason for the lack of validity of the statement of odds lies deeper, therefore, than a mere technical error. Unwarranted precision is often dangerous to an observer himself, and more often to others, in spite of an author's warnings about tentative results. Any survey of medical literature shows that this is no academic or imaginary danger.

Unlike a number of readers who have written to me regarding my article, Mr. Tumarkin seems to have misunderstood the purpose, principles, methods, and results of the last three-quarters of it. My endeavour was to show that whenever one has a sample from which odds (or a ratio or chances) can be estimated it is possible to answer the question: How often would such a sample arise by chance (unbiased sampling) if the true odds were, for example, 2 to 1, or any other value apparently very different from the value suggested by the sample? The answer, based on common knowledge of the effects of chance, helps to arm an observer against the fatal tendency of figures to "speak for themselves." Rule of thumb in using any tool or method is dangerous, and to show the validity and meaning of the standard deviation test there was introduced the mathematics to which Mr. Tumarkin is probably referring when he speaks of "the most imposing methods." The standard deviation test itself, which occupies about one line of foolscap, can hardly be so called. In this demonstration some of Mr. Tumarkin's figures were used with the preliminary statement: "It will be assumed that all such detectable influences [that is, those that cause bias] have been ruled out." Bias due to failure of patients to answer questionaries is so obvious that it was not specifically mentioned. The results, therefore, cannot be justly called "completely misleading figures," and in whatever form Mr. Tumarkin's or other data had been used they would have served equally well as a demonstration of the misleading nature of odds estimated from samples without allowance for chance.

Mr. Tumarkin states that "the application of rigorous mathematical methods to the tentative results of an experimental science is still a subject of discussion, even among mathematicians themselves." Opinions applicable to biology, of which medicine is a branch, are not necessarily obtainable from pure mathematicians (or even from those workers in biology and medicine whose outlook is that of the pure chemist or pure physicist), but from workers who are familiar with the methods and results of using quantitative methods in biology. Moreover, when criticisms are heard it is important to avoid the easy confusion between two types of mathematical procedures: (1) The demonstration, such as discussed above, of the extent to which chance, acting alone in a certain set of conditions, could account for the result found in an actual sample. This procedure, when properly understood, will be seen to be indisputably valid, and in such tests as the standard deviation is not "rigorous," nor does it overlook the warning against over-precision. It ceases when it has answered the question put to it, leaving the observer to decide whether for him chance could sufficiently account for the result, or whether some other factor was likely to be responsible—for example, the factor under investigation, or even some hitherto undetected bias in the sample. (2) The argument from a given sample to the material that it represents—for example, the estimation of the healthy average blood-cholesterol value and normal range from a sample of a dozen people. Considerable knowledge of the type of material under investigation is necessary in such estimates, and here also medical literature shows that in many cases if suitable statistical methods had been applied they would have warned against a precision which later investigations have shown to be unwarranted.

Finally, Mr. Tumarkin says that further cases continue to confirm his figures. Presumably, of course, this is not stated as an argument against knowing at an early stage of an investigation how much or how little precision is warranted at that stage.—I am, etc.,

DONALD MAINLAND.

Dalhousie University, Canada, Dec. 27, 1936.

Endemic Goitre

SIR,—I was much interested in reading the important and valuable article which Sir Robert McCarrison wrote on the problems of "Endemic Goitre" in the *Journal* of January 2. I would like to draw attention to a mistake he has made in attributing the discovery that cyanides may cause goitre under certain conditions to Webster. This discovery was made by Marine and his co-workers (D. Marine, E. J. Baumann, A. W. Spence, and A. Cipra, *Proc. Soc. exp. Biol.*, N.Y., 1932, **29**, 772), and is only one of many which have been made in his laboratory.—I am, etc.,

London, W.1, Jan. 18. GEORGE GRAHAM.

Weight and Early Diagnosis

SIR,—At the present time, when the early diagnosis of disease is being so urgently stressed, may I enter a plea for regular weekly weighing as an important adjunct in discovering the beginnings of serious organic disease. It is well known that some of our most deadly diseases, such as cancer, tuberculosis, and diabetes, invariably start with an insidious slight loss of weight long before other clinical symptoms have manifested themselves. If free facilities throughout the country were afforded by the authorities concerned for the provision and use of weighing machines, frequently supervised, the public would soon become "weight conscious." Should the scales indicate an apparently "symptomless" loss of weight the patient could then immediately report to his doctor, when steps could be taken for a full clinical or laboratory investigation. It is still unhappily rare in general practice to see an internal case of cancer of less than six months' duration, and progressive loss of weight has often not been observed by the patient in the very early stages.

The knowledge by the public that accurate scales were provided free of charge for the benefit of their health would soon lead to their regular use, and help to bring to our notice early disease in its curable stage.—I am, etc.,

Sheffield, Jan. 11. ALFRED A. MASSER, M.B., Ch.B.

Prevention of Silicosis

SIR,—In reply to the letter in the *Journal* of January 9 (p. 95), may I draw Dr. J. A. Goodfellow's attention to Dr. Donald Hunter's contribution to this subject of which he may not be aware.[1]

Dr. Hunter points out that particles of silica could not retain momentum by the time they had reached the alveoli, and wounding of the lung tissue is therefore ruled out. It seems probable, he adds, that the silica acts as a chemical poison, and the addition to the mine atmosphere of a germicide, as Dr. Goodfellow suggests, would hardly meet the case. It seems much more logical to remove the danger at its source, and instead of iodizing the atmosphere, which would seem to be an impracticable and certainly very expensive procedure, the solution may lie along the lines suggested by Jones in 1934 as quoted by Dr. Hunter—namely, the utilization of the fresh, uncontaminated surface atmosphere, which is already at hand in the air-pressure pipes supplying the pneumatic drills.—I am, etc.,

London Hospital, E.1., Jan. 13. A. L. CRADDOCK.

*** Dr. Donald Hunter's work, to which Dr. Craddock draws attention, was the subject of a leading article in the *Journal* of December 5, 1936 (p. 1148).

Glycosuria

SIR,—In 1932 a patient of mine, aged 28 years, who was suckling her 7-months infant, complained of painful and swollen breasts, and of great thirst and frequent micturition. On examination I found the breasts extremely swollen and tender; with a breast pump I could only get a few drops of milk away. In the urine I found 3.75 per cent. of sugar. In ten days the swelling of the breasts had disappeared and the urine was free from sugar.

This unusual case supports Dr. Oliver's conclusion (*Journal*, January 16, p. 105) that glycosuria is a symptom and not an entity.—I am, etc.,

Birmingham, Jan. 17. ROBERT ANDERSON, M.D.

Proposed Medical Scheme for Public Schools

SIR,—As a result of the increasing interest aroused in the health and physical development of the school child and the recent proposals of the Board of Education in this connexion I wish to make a strong plea, and submit a scheme, whereby ideas of a similar nature might be incorporated in the administration of the public schools of this country.

Having been engaged as an investigating medical officer of a milk nutrition survey, conducted by the Milk Marketing Board and the Ministry of Health in certain elementary schools, and maintaining an absorbing interest in the recording of anthropometric data as a valuable asset to preventive medicine, I am convinced of the need for similar work of a permanent nature in public schools. I believe that it is of vital importance that the physical development and well-being of our public school youth of to-day should receive as much attention and supervision as that given to schools under the administration of the Board of Education.

The scheme would entail:

1. An annual medical examination with the recording of anthropometric data, together with certain physiological tests for the assessment of nutritional states of all boys (aged 12 to 18 approximately).

2. Supervision or suggestions as to the diet, particularly for those showing subnormal physique.

3. Control of exercise on a scientific basis suited to the needs of the individual.

4. Freedom of access to the medical officer by individual boys for information on the facts of life—this to be given, individually when needed, during the annual medical examination.

The administration of the scheme would be carried out as follows:

1. The medical service to be under the control of the Ministry of Education, or the board of governors of each school, and supported financially by a Government grant on a percentage basis with an annual contribution from the school fees.

2. The appointment of suitable medical officers interested in such work, on a whole-time basis, and employing a standard method of examination necessary for subsequent statistical calculations.

3. According to the number of boys at the various public schools and the time necessary for annual examinations, medical officers would be appointed to a group of schools sufficient for these examinations to be completed during each year.

The medical officer would in no way interfere with the position and work of the attending medical practitioner to the school, but would rather co-operate by referring such cases as needed treatment to him, should any such be discovered, during the annual examination. In dealing with schools of this nature the parents' interest and whole-hearted support should be assured, and I consider that this would be obtained when the scope of the work and the individual supervision and interest shown for each boy's physical development is realized.

Valuable data on the rate of growth and development of boys (aged 12 to 18 approximately) should be obtained, together with a wider knowledge of the optimum diet and amount of exercise necessary for the maximum physical development of the individual boy. Finally, I submit that this supervision would prevent the development of those cases showing a subnormal physique resulting from excessive exercise combined with undernutrition or malnutrition during the rapidly growing period of life.—I am, etc.,

London, W.1, Jan. 17. R. J. IRVING BELL.

Information Service for Research Workers in Human Genetics

SIR,—My executive committee invites your co-operation in making use of the service here announced and begs you to make it as widely known as possible.

One activity contemplated in setting up the Clearing House for Human Heredity is the organization of information service for research workers in the subject. The value of such a plan has been demonstrated in the information service already established for workers on drosophila, etc. It should be noted that apart from convenience of ascertaining easily centres at which comparable work is going on, the circulation of notice by those engaged in a particular inquiry of their work is a safeguard in dating priority—a point to which it is natural to attach some importance.

Workers are requested to address to the Bureau a short paragraph describing the work on which they are engaged. These notices will be multiplied and circulated to all those co-operating. In the first instance this bulletin will be issued every twelve months. Later supplementary bulletins will be issued more frequently. Those using this service are asked to subscribe 5s., or a sum equalling approxi-

[1] *Lond. Hosp. Gaz.*, Clinical Supplement, Industrial Diseases, December, 1935, p. 51.

mately one-quarter of a pound sterling equivalent in the currency of their country. The accepted languages are: French, German, English.—I am, etc.,

R. RUGGLES GATES,
Chairman, Bureau of Human Heredity.

115, Gower Street, W.C.1, Jan. 14.

Respiratory Poisons

SIR,—May I refer to Dr. J. A. Goodfellow's very interesting letter in your issue of January 9 (p. 95) concerning the widely variant effect of silica particles in causing silicosis, (*a*) when coal dust is also present, and (*b*) when coal dust is absent. Supposing it a true explanation that the divergence of incidence of silicosis in the two cases is that in the case of (*a*) the incisions in the tissues made by the sharp siliceous particles remain uninfected because of the antiseptic effect of the coal particles, this would seem to be a special case of the general, widely applied action of carbon particles in powerfully absorbing or adsorbing other matter in the finest state of division.

I use the term "respiratory poisons" to cover noxious gases or fumes; biological units—for example, bacteria moving through the breathable atmosphere; any such bacteria resident in the lungs; and organic or inorganic particles such as silica. And the modes in which these can become incident are (1) breathing of poisonous gases or fumes together with air otherwise impure, or (2) breathing such gases or fumes, or otherwise impure air, independently.

It will be realized that there is a whole string or succession of such respiratory poisons at all times, varying in incidence, severity, and persistence, and that those not subjected to one are to some extent subjected to another, be it ever so mildly; and that, in fact, the excellent picture which Dr. Goodfellow paints is really, as it were, the last scene in the play, where two specific inhalations only—namely, coal dust and silica dust—are the chief consideration. At the other end of the string or succession of variegated breathable poisons may be considered the vile poison gases which are being projected into, or prepared for, human lungs in war (civil or international) or industrial strife. As regards prevention, the stage here shifts from inside to outside the lungs, and we find again that just as coal (carbon) particles were a valuable internal preventive against bacterial poisoning, made otherwise likely by fine silica dust particles, so carbon particles are now a valuable external preventive against poisoning, made otherwise likely by still finer noxious gas particles or molecules. The coincidence of action of the coal or carbon particles in the two remote cases is too striking to miss, but the implications of the action of carbon particles in respect to bacterial or other respiratory poisons is by no means confined to the remote extremes of the respiratory poison precession.

For in between these extreme cases—both beneficent—of the powerful action of carbon particles is a vast field contrasted with which they are relatively insignificant, where they operate not only in the relatively isolated cases of sufferers from silicosis and war gases—terrible and wide as those may be—but on all members of the community without exception, at all times. Throughout this vast general field of respiratory poisoning the carbon particles—again the chief element—have shed their benign role and adopted the sinister one held by the silica particles in the case of silicosis. This, however, is not because their operation is not the same—that is, adsorption of other finely divided particles—but because they are adsorbing materials which are external to the lungs before carrying them there, rather than material already in the lungs.

The carbon particles in this central case of vast incidence are those innumerable soot particles which largely comprise atmospheric pollution, and are presented to all our lungs as either fogs or dry filth, dependent on humidity and temperature conditions. T. McLachlan[1] has insisted on the rather ignored probability of the biological and bacterial aspect of atmospheric pollution. He maintains, in fact, that the air is "a soil which is fertilized by the by-products of combustion and the residue of animal and vegetable offal which are distributed throughout the air," and I myself have also considered this viewpoint.[2]

The string or succession of the above respiratory poisons can be summarized:

Field of Application	Human Incidence	Nature of Carbon	Action of Carbon	Effect of Carbon
Silicosis victims	Internal to lungs	Coal particles	Adsorbent and antiseptic	Beneficial
Poison gases (peace or war)	External (excluded)	Carbon „	Adsorbent and antitoxic	Beneficial
Atmospheric pollution	External (inhaled)	Soot „	Adsorbent and septic	Noxious

In view of what I thus find is the almost inescapable conclusion that the adsorptive power of carbon (coal, soot, or amorphous) is not merely an important chemical and physical fact of interest in isolated fields or cases, but a reaction of wide general implication and application, affecting the health, welfare, and prosperity of all, I would like to be allowed to advance the following points for serious consideration and, it is hoped, prolonged research.

1. How many bacteria, or other biological units, are adsorbed, nourished, increased, and introduced persistently as respiratory poisons by atmospheric carbon particles? Is this, for example, how an influenza epidemic is promoted and spread?

2. Does the adsorptive power of carbon particles for gases (*a*) take up nitrogen and oxygen in atmospheric proportions from the atmosphere, thus leaving their atmospheric mixture unvaried, or (*b*) does it adsorb proportionately more oxygen than nitrogen, thus devitalizing the atmosphere as well as poisoning it?

3. If the carbon particles adsorbed proportionately more nitrogen, "atmospheric pollution" would produce exhilaration, as ozonized sea air does.

4. Does the atmospheric pollution which robs us of roughly 50 per cent. sunshine and ultra-violet rays, in a country where 100 per cent. would not be too much, also, in addition to harbouring and increasing bacterial life for our inspiration, prevent *per se* the destruction of even such bacteria as would be air-borne if such pollution were absent, due to the 50 per cent. reduction of sunlight bactericidal action?

I feel sure, Sir, that these will be realized as questions of vital importance and of pressing concern for the whole community, showing that the dread silicosis is but an intense, though isolated, field of the quite general respiratory poisoning which calls urgently in *all* its phases for a campaign of extermination at any cost. For respiratory poisoning is perhaps the greatest reality of atmospheric pollution, whether seen from the biological or the non-biological angle, and the possible oxygen depletion in respiratory poisoning is a most serious factor which, if established, would demand urgent national measures to ensure the complete cessation of atmospheric pollution.—I am, etc.,

Leeds, Jan. 9. S. C. BLACKTIN.

[1] *J. Soc. chem. Ind.*, January 2, 1937, p. 21.
[2] Ibid., January 9, 1937, p. 46.

Sir J. Y. Simpson and Chloroform

SIR,—From its very nature an abstract is apt to omit some detail and so convey a wrong impression. This may be the explanation of the elliptical statement in the condensed version of Dr. Douglas Miller's presidential address (*British Medical Journal,* January 9, p. 87) that "after further research, in which self-experimentation played an important part, chloroform was discovered [by Simpson] on November 4, 1847." The actual antecedents of the discovery of the properties of chloroform as a general anaesthetic were assembled by me in a paper read before the British Pharmaceutical Conference in 1934, a reprint of which I enclose.[1] Briefly, the relevant data are:

1831–2, discovery of the chemical compound chloroform independently by Guthrie, Soubeiran, Dumas, and Liebig. 1833, chloric ether, a spirituous solution of chloroform, used internally by Dr. Black of Bolton in asthma and adynamic conditions of the system. 1838, chloric ether, which Mr. David Waldie had brought to the notice of Dr. Formby of Liverpool, prescribed by him as an anti-spasmodic. 1842, Dr. Mortimer Glover, a young Edinburgh graduate, discovered by experiment that chloric ether was a powerful narcotic poison to animals, one of its effects being to induce in them anaesthesia and insensibility. J. Lyle Davidson, a pharmacist, in a letter to the *Pharmaceutical Journal* (January 25, 1908), cites the testimony of his father that he, when a student at Newcastle-upon-Tyne, was for demonstration purposes put under chloroform by his teacher. 1847, Flourens, the French physiologist, demonstrated that the inhalation of chloroform caused in animals precisely the kind of anaesthesia induced by the inhalation of ether. In the same year Sir William Lawrence and Mr. Holmes Coote began to use chloric ether as a general anaesthetic at St. Bartholomew's Hospital, London, having been made acquainted with its applicability for this purpose through an experiment on himself by an assistant in the service of Jacob Bell, one of the founders of the Pharmaceutical Society.

Simpson's dramatic narrative of the after-dinner experiment in his house in Great Queen Street, Edinburgh, at least as regards his ostensible ignorance of the anaesthetic properties of chloroform, is discredited by the fact that Waldie of Liverpool had expressly suggested its use to him, and even more conclusively by the fresh evidence disclosed in the biography of Sir Robert Christison, in the passage now quoted.

"One day when he, Dr. Matthews Duncan—one of Simpson's colleagues—was in Dr. Gregory's laboratory at the College, he got possession of every liquid in the laboratory which he imagined would breathe. Four or five bottles were carried off, and chloroform was one. At the time correspondence with Dr. Waldie was being carried on, and the suggestion by that gentleman to try chloroform had *not* been heard of by Dr. Duncan. He had previously experimented upon himself with various substances, but found none suitable. On trying chloroform he was convinced that the article sought for had been found. The same or the next evening the trial was repeated by Dr. Keith, Sir J. Y. Simpson, and himself. This is the trial which is a matter of history, but the previous trial has never been noticed."

In the whole transaction Simpson shows up in an unfavourable light, especially by indefensible silence as to the lead given to him by Waldie and Matthews Duncan's experiment on himself. To repeat what I wrote:

"What is to his [Simpson's] everlasting credit, and forms the greenest and most lustrous leaf in his crown of bays . . . is the intrepid and triumphant battle that he waged for the official adoption and establishment of chloroform as a general anaesthetic."

—I am, etc.,

London, N.6, Jan. 11. J. P. GILMOUR.

[1] *Quart. J. Pharm. and Pharmacol.*, 1934, **7**, 440.

Medical Service in the Territorial Army

SIR,—The country has decided that the time has come to look to our defences, and great efforts are being made to encourage the young men of the country to join the Territorial Army. I feel that many medical men do not realize the advantage the Territorial Army offers in the matter of comradeship and opportunities to study their profession from a rather different aspect. The general practitioner can find his sphere as a regimental medical officer or as a member of a field ambulance; the consultant as a member of a general hospital staff; the laboratory worker and public health officer in a hygiene company. There is no great demand on the scant leisure of the doctor, and the pleasure gained is great. If any medical man in the London district is interested and will write to me I will do all I can to help find him the right billet.—I am, etc.,

R. S. TAYLOR,
Captain R.A.M.C., T.A.

88, Portland Place, W.1,
Jan. 15.

The New Journal Typography

SIR,—May I, as a brother Editor, congratulate you sincerely on your new format. I think I can truthfully say that it has been only on the very rarest occasions that I have not "gone through" each weekly number since I became a member of the B.M.A. over 40 years ago. This even with holidays intervening, as I have always had my numbers saved while I was away (world tour included) and have "gone through" them on my return. My object has been to note, and generally to read, any article or information having reference to the department of medicine in which I practise, and also to follow the political activities of the Association. The new format makes this job infinitely more easy.—I am, etc.,

London, W.1, Jan. 15. COMYNS BERKELEY.

The Services

QUEEN ALEXANDRA'S MILITARY HOSPITAL

The War Office announces that Professor C. Hadfield, M.D., F.R.C.P., department of pathology, St. Bartholomew's Hospital, has been appointed honorary consultant in pathology to the Queen Alexandra Military Hospital, Millbank, S.W., in succession to the late Professor E. H. Kettle.

COLONEL COMMANDANT R.A.M.C.

Major-General H. Ensor, C.B., C.M.G., C.B.E., D.S.O., R.A.M.C., R.P., has been appointed Colonel Commandant Royal Army Medical Corps, vice Major-General O. L. Robinson, C.B., C.M.G., R.A.M.C., R.P., who has attained the age limit for his appointment.

DEATHS IN THE SERVICES

Lieut.-Colonel JOHN ROBERTSON, I.S.O., Indian Medical Department (ret.), died at East Sheen on January 11, aged 74. He entered the Subordinate, now the Indian, Medical Department in 1882, and after his course of instruction at the Calcutta Medical College joined the Service as an assistant apothecary in 1886. He rose gradually in that Service till he attained the senior rank in it, that of senior assistant surgeon and major, retiring on March 1, 1926. Just previous to his retirement, on January 1, 1926, he was granted the rank of lieutenant-colonel, a rank which had previously been bestowed on only one member of the I.M.D., the late Lieut.-Colonel T. H. Hill, who was the last medical survivor of the Mutiny. Robertson was selected for civil employ early in his service, and spent most of his time at Simla and at Nagpur, the capital of the Central Provinces, where he was

assistant to the civil surgeon, and acted on several occasions as civil surgeon of the station. Before retirement he was given the Imperial Service Order. He had been assistant surgeon to four Viceroys—Lords Hardinge, Chelmsford, Reading, and Irwin. He leaves a widow, a son, and two daughters.

Universities and Colleges

UNIVERSITY OF CAMBRIDGE

The Vice-Chancellor gives notice that the Professorships of Zoology and Physiology and the William Wyse Professorship of Social Anthropology will become vacant on September 30, 1937.

D. V. Davies, M.B., B.S.Lond., and W. R. M. Morton, M.D.Belf., have been appointed university demonstrators in the Department of Anatomy for three years from January 1, 1937.

With the object of encouraging original medical research the Grocers' Company offers annually three scholarships, each of £300 a year, tenable for one year and renewable for a further period of one or two years. Candidates must be British subjects under 35 years of age. Applications must be made before April 30. Forms of application may be obtained from the Clerk of the Company, Grocers' Hall, Princes Street, London, E.C.2. Further particulars may be seen at the University Registry.

A series of lectures on the history of science, open without fee to all members of the University or of Girton or Newnham Colleges, will be given in the lecture room of the Physiological Laboratory at 5 p.m., on January 22, 29, February 5, 11, 19, and 26, and March 5 and 11. The lecturers are Sir W. C. D. Dampier, Dr. J. Needham, Mr. J. D. Bernal, Sir A. S. Eddington, Dr. H. H. Thomas, Dr. D. McKie, Professor R. C. Punnett, and Professor A. Ferguson.

The title of the degree of B.Chir. was conferred during the month of December, 1936, on M. P. Shackle (Newnham) and W. Y. Young (Girton).

Dr. H. A. Harris, Professor of Anatomy, has been elected into a professorial Fellowship at St. John's College; and Dr. G. P. McCullagh, University Demonstrator of Pathology, to a reserved Fellowship at Queen's College.

UNIVERSITY OF LONDON

LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE

The following candidates have been approved at the examination indicated:

POST-GRADUATE DIPLOMA IN PUBLIC HEALTH.—*Part I:* J. K. Adranvala, D. M. Blair, Kathleen G. Brimelow, Joyce M. Brockington, P. N. Chatterjee, A. B. Christie, Kitty K. Conrad, J. S. Cookson, Teresa I. M. Craig, Iris M. Cullum, C. F. Cumings, B. K. De Silva, S. Graham, Eva M. Gray, H. F. Green, R. M. M. Hunter, J. D. Lendrum, S. E. D. Masilamani, B. B. Mukerjee, D. Murray, A. F. S. Perera, Violet M. Spiller, Tsung-Sing Sze, J. W. P. Thompson, A. F. Turner, H. M. van der Wall, Sarah C. B. Walker, L. A. F. Wiles, Isabel A. M. Woods.

UNIVERSITY OF LEEDS

Appointment of Readers in Medicine and Surgery

On the recommendation of the Board of the Faculty of Medicine, the Council of the University has advertised for Readers in Medicine and Surgery. Those who are appointed will have to devote all their time to the duties of the posts, and the salaries are fixed at £600 per annum. Without its being made an absolute condition, it is mentioned as desirable that candidates for the medical and surgical posts respectively should have the Membership of the Royal College of Physicians of London or the Fellowship of the Royal College of Surgeons of England, and should not be more than 35 years of age. Application has been made by the University to the Board of Management of the General Infirmary that facilities should be afforded to these two officers to carry out certain of their duties within its walls, and this has been readily granted. In general terms it may be stated that the duties of the posts will be mainly those concerned with research in medicine and surgery under the direction of the professors of those subjects, and it is hoped that the correlation of clinical and laboratory investigations will receive special attention. Those who are appointed will take an important part in the teaching of the two subjects.

UNIVERSITY OF ABERDEEN

The King, on the recommendation of the Secretary of State for Scotland, has approved the appointment of Dr. John Stirling Young, professor of pathology in the Queen's University, Belfast, to be Regius Professor of Pathology in the University of Aberdeen, in the place of Professor Theodore Shennan, resigned.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

At a meeting of the Council of the College, held on January 14, with Sir Cuthbert Wallace, the President, in the chair, the death of Sir John Bland-Sutton, Bt., was reported and a resolution of condolence was passed.

Sir Cuthbert Wallace was appointed to represent the College at the Coronation ceremony, Dr. John Beattie on the Huxley Memorial Lecture Committee, Sir Arthur Keith on the Joint Committee of Anthrolopogical Research and Teaching, Mr. Eardley Holland on the Central Midwives Board, and Mr. L. R. Braithwaite on the Medical Advisory Committee of the British Health Resorts Association.

The Council agreed to enter into a contract for the rebuilding of the upper floors of the College as the Bernhard Baron Research Laboratories.

The best thanks of the Council were given to Lord Moynihan for the gift of the instruments used by the late Lord Moynihan.

A cheque for £25 was received from Mr. Walter Radcliffe, M.R.C.S., for the specific purpose of cancer research, and the best thanks of the Council were given him for his gift.

A diploma of Fellowship was granted to R. G. Worcester, and a diploma of Membership to B. J. Green.

The following diplomas were granted jointly with the Royal College of Physicians:

DIPLOMA IN PUBLIC HEALTH.—R. M. Campbell, A. B. Donald, P. J. Doody, M. S. A. Hamid, Enid A. Hughes, Vida L. Liddell, C. Muir, K. Somaskander, H. E. Stevens.

DIPLOMA IN PSYCHOLOGICAL MEDICINE.—K. C. Bailey, B. P. Bhattacharjya, C. M. Carlyle-Gall, L. A. Collins, J. G. Dewan, D. S. Fairweather, H. Gillies, Lilian A. Hayward, B. H. Kirman, E. H. Kitching, A. R. McPherson, M. L. Meade-King, T. A. Ratcliffe, D. E. Sands, W. W. Sargant, A. S. Thorley, D. B. Watson.

DIPLOMA IN LARYNGOLOGY AND OTOLOGY.—D. L. Brown, C. W. Dixon, N. Dutt, G. A. Jamieson, R. N. Misra.

The following hospital with the post specified was approved for recognition for the six months' surgical practice required of candidates for the final Fellowship examination: The Cheltenham General and Eye Hospitals (house-surgeon at the General Hospital).

VITAL STATISTICS FOR ENGLAND AND WALES, 1936

We are indebted to the Registrar-General for the following statement regarding the provisional birth rates and death rates, and the rates of infantile mortality, in England and Wales and in certain parts of the country, during 1936. The statement is issued for the information of medical officers of health.

ENGLAND AND WALES

Birth Rate, Death Rate, and Infant Mortality for the Year 1936 (Provisional Figures)

	Rate per 1,000 Resident Population		Deaths under 1 Year per 1,000 Registered Live Births
	Live Births	Deaths (Crude Rates)	
England and Wales	14.8	12.1	59
122 county boroughs and great towns, including London	14.9	12.3	63
143 smaller towns with estimated resident populations of from 25,000 to 50,000 at the 1931 Census	15.3	11.7	55
London (administrative county)	13.7	12.5	66

NOTE.—The birth and death rates for England and Wales as a whole are calculated on the estimated mid-1936 population, but those for the towns aggregates and for London are calculated on the estimated mid-1935 populations.

The birth rate for 1936 is 0.1 above that for 1935 and is 0.4 above that of 1933 the lowest recorded.

The crude death rate is 0.4 above that of 1935 and 0.7 above that of 1930, the lowest on record.

The infant mortality is 2 above that of 1935, which was the lowest recorded, and is the same as that of 1934, the previous lowest record.

Obituary

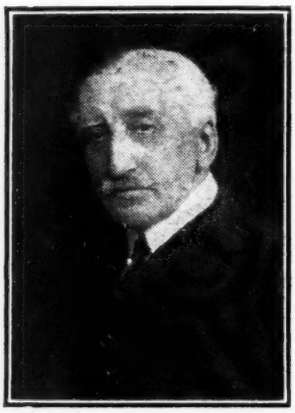
WILLIAM HUNTER, C.B., M.D.

LL.D., F.R.C.P.

Consulting Physician, Charing Cross Hospital

We much regret to announce the death in London, on January 13, of Dr. William Hunter, who was a pioneer in the application of Lister's teaching to general medicine, and more than thirty-five years ago arrived at the conception of what is now a commonplace—the influence of chronic local infection on the body generally.

William Hunter was the eldest son of Robert Hunter of Birkenhead. He was born on June 1, 1861, and received his medical education at Edinburgh University, where he graduated M.B., C.M. in 1883 with first-class honours, taking the M.R.C.S.Eng. diploma in the same year. His outstanding merits as a student were recognized by the award of the Beaney prize for the highest marks gained in anatomy, surgery, and clinical surgery during the medical examinations at Edinburgh, and also the Ettles scholarship for being the most distinguished student of his final year. After serving as resident house-physician in the Royal Infirmary, Edinburgh, and on the staff of the Western Dispensary, he received a grant from the British Medical Association on the recommendation of the Science Committee and went to Leipzig (1884), where he worked in the pathological laboratory. On returning to Edinburgh he continued in the Physiological Laboratory as assistant to the professor. His researches were embodied in a thesis for his M.D., on the physiology and pathology of blood transfusion and the fate of extravasated blood (1886), for which he received a gold medal. He also held a research scholarship of the Grocers' Company.



Hunter took an active and distinguished part in the scientific life of Edinburgh, being a Fellow of its Royal Society and president of the Royal Medical Society. After some further work in Vienna he was awarded in 1887 the John Lucas Walker Studentship at Cambridge for whole-time laboratory research in pathology. He held this post until 1890, and during its tenure worked on the problems of pernicious anaemia, visiting Strasbourg in search of experimental facts. In 1889–90 he delivered the Arris and Gale Lectures before the Royal College of Surgeons on transfusion of the blood. On leaving Cambridge he became assistant physician to the West London Hospital and to the London Fever Hospital, and later was appointed to the staff of Charing Cross Hospital and School as assistant physician, officer in charge of the electrical department, and joint lecturer in practical medicine and pathology. From 1910 to 1915 he was dean of the school, and on retirement from the active staff he was made consulting physician.

Hunter's name will be associated in medical history with his investigations over a period of twenty years on pernicious anaemia. These he began in 1885, and he carried out the larger portion of this experimental work, histological and chemical, whilst holding the John Lucas Walker Studentship at Cambridge; the results were recorded in various papers between the years 1888 and 1890. His early researches suggested to his mind that pernicious anaemia was not merely a special form of anaemia but a definite and, in regard to mode of onset and site of infection, a well-characterized chronic infective disease, localized to the alimentary tract; one in which long-standing sepsis, oral and gastric, played an essential and important antecedent and concurrent part. The anaemia itself, in his view, was not the sole feature and the cause of all its symptoms and lesions; it was only one of the symptoms, there being at least three other groups—haemolytic, gastro-intestinal, and toxic. He was the first observer to note that the alimentary and nervous system were more or less seriously affected in the disease, and he recognized the importance of the deposit of iron in the liver, which he explained as being due to haemolysis in the portal system. These researches on the iron in the liver and other organs formed the basis on which the haemolytic conception of the disease was based. Oral sepsis and a tender tongue, he maintained in subsequent papers and monographs, were always present. He did not approve of Ehrlich's theory that the megaloblastic marrow was concerned in the disease; it was not secondary to some debilitating organic disease such as cancer, but a primary disease. The excess of pigment in the liver interested him greatly. Previous observers had noted it but thought that it had no special significance, since it occurred also in other diseases. Hunter, however, found that in no other disease was there so much pigment and iron in the liver. In the monograph of 1901 on *Pernicious Anaemia* Hunter's clinical conclusions were drawn from only a dozen cases, met with in private or hospital practice. His wider experience, especially on the clinical side, was recorded in *Severest Anaemias*, vol. i (1909). By this time he had definitely abandoned the term "pernicious" for any form of anaemia. This he did "out of regard for the patient and in the interests of clinical medicine" because in his opinion the term connoted nothing but confusion, "without its equal in the history of any disease or group of disease." He preferred the term "Addisonian anaemia." He felt strongly on the matter and especially objected to Biermer's grouping of a number of different forms of anaemias as progressive pernicious anaemia, and to Ehrlich's blood observations "and the singularly misleading aetiological and haematological traditions, which in consequence of these observations have for the past thirty or forty years gathered around the unhappy and unfortunate name of pernicious anaemia." His 1909 conception of the disease in a nutshell was that "Addison's anaemia is a very remarkable disease of a specific infective haemolytic nature, the specific infection being localized to the alimentary tract." In the seven years before publishing this work he had had seventy-five cases under his care, and glossitis had been present in every one. This volume has many tables and opinions of various observers arranged in parallel columns. It also has several good pathological illustrations. It is a work of reference but conveying all through in no unmeasured way the certainty of its writer of the soundness of his own view. The second volume, on septic anaemia, which was contemplated, never saw the light of print. Knowledge of this subject has grown apace in the past twenty-five years, and pernicious anaemia is now regarded as a true deficiency disease. Not all of Hunter's view of symptoms is held to-day. Thus glossitis or sore tongue is not met with in every case, and oral sepsis as an aetiological factor has faded into the background. Recent observations also

show that there is often a very definite family history of Addisonian or other anaemias. Hunter wrote a series of articles for Allbutt and Rolleston's *System of Medicine* in the section on the liver and its function and disorders, jaundice, Weil's disease, acute yellow atrophy, phosphorus and chloroform poisoning, and congestion. The article on jaundice was a lengthy, well-arranged consideration of the various theories explaining the causation of obstructive and non-obstructive varieties. A good deal of his own studies on blood destruction was embodied in these articles. He also wrote the articles on the treatment of anaemia and purpura in the *Index of Treatment* edited by Hutchison and Sherren.

He became a member of the Royal College of Physicians in 1889 and was elected to the Fellowship seven years later. He was an examiner at the College for a few years, but took no other part in its activities. He acted also as examiner for Cambridge and Glasgow Universities and received honorary degrees for his scientific work. During the war he was in charge of a British mission to Serbia, and in 1920 published an account of the epidemics of typhus and relapsing fever which occurred there. He was also president from 1915 to 1917 of the Medical Advisory Committee for the Eastern Mediterranean and Mesopotamia Expeditionary Forces, and later consulting physician to the Eastern Command, with the temporary rank of colonel A.M.S. For his services in the war he received the C.B. and a high Serbian decoration—that of Grand Officer in the Order of St. Sava.

Dr. William Hunter joined the British Medical Association in 1887; he was honorary secretary of the Section of Pathology and Bacteriology at the Montreal Meeting in 1897, vice-president of the Section of Pathology at Exeter in 1907, and vice-president of the Section of Medicine at Birmingham in 1911.

Dr. A. W. OXFORD writes:

Charing Cross Hospital is lamenting the loss of its oldest consulting physician, Dr. William Hunter. His first connexion with the hospital was before he was elected to the staff, when he entered into controversy with Sir F. W. Mott on the subject of pernicious anaemia. Mott used to assert that Hunter argued from one post-mortem on the disease, while he himself had performed three. They became good friends, however, soon afterwards when Hunter was elected assistant physician to Charing Cross Hospital, and each concentrated on special subjects and became famous.

Hunter devoted his whole life to the hospital. When he was made dean he entirely renovated the medical school, which had been neglected for many years, and also classified the museum and wrote a catalogue. When he was made in-patient physician he carried out the same renovation in the medical wards, which were dark and dingy compared with the surgical wards. He also wrote a comprehensive history of the hospital and school. He took a great interest in the students and was much valued by them as a clinical teacher. Of his scientific work and his work during the war others can speak with far more knowledge, but the love and admiration felt for him by his colleagues and old students was shown by a dinner given to him when the lapse of years compelled his retirement. He always retained his interest in the hospital and, until the last two months, was regular at the meetings of the council. He will be long remembered and regretted.

[The photograph reproduced is by Vandyk, 41, Buckingham Palace Road, S.W.]

J. A. MACWILLIAM, M.D., LL.D., F.R.S.

Emeritus Professor of Physiology, University of Aberdeen

The death took place, in an Edinburgh nursing home, on January 13, of Emeritus Professor John Alexander MacWilliam, late of the chair of physiology at Aberdeen. He was born in 1857 at Culmill, and after a medical course at Aberdeen University graduated M.B., C.M. in 1880, gaining the John Murray Medal. In 1882 he took the M.D. degree with honours, choosing as the subject of his thesis the cardiac muscular fibre in the various classes of the animal kingdom and the diaphragmatic fibre in various animals. He studied for a time at the Universities of Edinburgh and Leipzig, and at University College, London, where he acted as assistant to the professor of physiology. For a time he was on the staff of Charing Cross Hospital Medical School, London, and lecturer on physiology in the London School of Medicine for Women.

In 1886 MacWilliam was appointed professor of physiology at Aberdeen University in succession to Professor Stirling, and retired from that post in 1927. He had great qualities as a teacher and scientific investigator, and his contributions to physiological knowledge were numerous, including "The Rhythm of the Mammalian Heart" and "The Phenomenon of Inhibition in the Mammalian Heart," both published in the *Journal of Physiology*; "Estimation of Systolic and Diastolic Blood Pressure," in *Heart*, 1913; "Blood Pressures in Man under Normal and Pathological Conditions," in the *Physiological Review*, 1925; and various other papers dealing with the action of chloroform and ether, proteins, muscle sound, etc., which appeared from time to time in the *Proceedings of the Royal Society*. He was a Fellow of the Royal Society, and in 1928 the University of Aberdeen conferred upon him the honorary degree of LL.D. He joined the British Medical Association in 1889, was vice-president of the Section of Physiology at the Annual Meeting in 1898, and of the Section of Anatomy and Physiology in 1914, and president of the Section of Physiology in 1922.

Professor MacWilliam's recreations were chiefly motoring and cycling, and he had travelled widely in various parts of the world. He was twice married, and is survived by his widow.

ARTHUR HUGH THOMPSON, M.D.

Consulting Surgeon, Western Ophthalmic Hospital

By the death at Hampstead on January 11 of Dr. Hugh Thompson the profession has lost an accomplished ophthalmic surgeon and a man of attractive character. He was born in 1859, being the youngest of the seven sons of Charles Thompson of Cardiff, where his family held a good position. Most of his early education was received at Grove House, Tottenham, whence he proceeded in 1878 to Trinity College, Cambridge. He had then no thought of a medical career, but read history, in which he took honours in 1882. A far finer achievement was his winning the senior Whewell scholarship in international law in 1880. After taking his degree he engaged in teaching and lecturing, and was one of the earliest workers at Toynbee Hall under Canon Barnett. It was then that he became convinced that medicine was the career in which he could best serve his generation. From that conviction he never swerved. For his first medical studies Thompson returned to Cambridge, where he attended at Addenbrooke's Hospital, and from there went on to the London Hospital. He qualified as M.R.C.S. and L.R.C.P. in 1891 and the same year took the M.B. and B.Ch. degrees at Cambridge; the M.D. followed in 1900.

After a short period in general practice at Hampstead Thompson turned to ophthalmology, and served for some years as clinical assistant to Mr. Lang. In 1898 he was appointed assistant surgeon at the Western Ophthalmic Hospital, became full surgeon in 1901, and after serving as such for twenty years was made consulting surgeon, though he continued for some time after to help in the current work of the hospital. To that institution he gave the best work of his life, and it is not too much to say that by his efforts and those of his then colleagues it was raised from an unimportant position to the honourable place it now holds among the ophthalmic hospitals of London. Thompson himself spared neither pains nor money to help in bringing that about. Accuracy marked his work as a surgeon. In diagnosis he was rarely at fault, in operating careful to a degree, in treatment resourceful and always open to new methods. High myopia was a subject which specially interested him. While enjoying a fair private practice (on which he was not actually dependent), this allowed him time to use his pen, which indeed was rarely idle. Though he never produced any book he contributed many papers and reviews to current ophthalmic literature, was joint editor of the *Ophthalmic Review*, and for twelve years supplied material to the *Medical Annual*. A fine piece of work on which he spent much labour, in conjunction with Mr. Willoughby Cashell, is described in a paper recording the occurrence of sixteen cases of congenital optic atrophy in a pedigree of six generations.

Too much devoted to his profession to require any absorbing hobby, Thompson was yet far from being a narrow specialist. He enjoyed life on many sides. In earlier years a skilful skater and skier, he was a keen golfer until his health began to fail. A traveller, and widely read in modern literature, he professed advanced opinions on social and political questions without upsetting his more conservative friends. And his genuine taste for art was shown in his support of the National Art Fund. A surgeon of high attainments, he was also a cultivated gentleman. That indeed was much, but Hugh Thompson was something more, for to those who knew him best he exhibited a life lived on a high plane, inspired by unselfish purpose, intent on serving his fellow men.

The death occurred on January 13, at Stockport, of Dr. S. H. D. GANDHI, at the age of 55 years. Descendant of an old Parsee family, Dr. Gandhi received his early education in the State of Jodhpore, Rajputana, and later entered the Grant Medical College, Bombay, for his medical training. He came to Manchester in 1902, became a student of the Victoria University, and graduated M.B., Ch.B. in 1907. The first decade of his medical life was spent (in the words of Sir Andrew Clark) in "striving for bread," doing a few hospital appointments and numerous locumtenencies and assistantships in England and Wales. In 1914 he settled at Stockport, and by dint of untiring hard work and great kindness to the poor and unfailing courtesy rapidly built up for himself a large practice, and so reached the "bread-and-butter stage" of his life's work. Ever ready and willing to respond to the ceaseless night and day calls in the life of a busy G.P., he entered upon the third decade—"the cakes and ale stage"—which, alas! he never lived to enjoy. A great student of languages and literature, he was the proud owner of a considerable library; a keen and good musician, he possessed a fine library of music; and in spite of his laborious life managed to snatch time for the pursuit of these hobbies, looking upon his beloved library as a great catalyser. His health began to fail three years ago, and early in 1936 his illness forced him to take to his bed, which he practically never left. His loss will be keenly felt by a large number of patients, especially the needy poor.

Dr. MARGARET THACKRAH died in London on January 10, aged 56. She was educated at the North London Collegiate School and University College, London, where she took her B.A. degree. In 1903 she entered the London (Royal Free Hospital) School of Medicine for Women, qualifying M.B., B.S. in 1909. After holding several resident appointments, including those of house-surgeon to the Royal Free Hospital, medical officer at Maltings Farm Sanatorium, Nayland, and medical officer to the C.E.Z.M.F. Hospital, Quetta, she obtained the M.D.Lond. in medicine in 1914 and the M.R.C.P. in 1920. During the war she was one of the civilian physicians attached to the Military Hospital, Endell Street, and medical officer to a T.N.T. filling factory. In 1915 she was appointed assistant physician to the South London Hospital for Women, and from 1926 to her death she was senior physician to that hospital. After the war she became specially interested in functional nervous disorders, and for sixteen years was psychologist to Dr. Barnardo's Girls Village Home. Dr. Thackrah's work in psychiatry was characterized by understanding and helpful kindness; she inspired great confidence in patients from every walk of life, her one consideration being whether she could give the help needed to overcome distress of mind.

Our Paris correspondent informs us of the death of Dr. AMÉDÉE MAURAT at Chantilly, near Paris, at the age of 90. He was the honorary president and a member of the executive committee of the Sou Médical, the most important philanthropic co-operative organization for self-defence in the French medical profession.

Medical Notes in Parliament

The House of Commons reassembled on January 19, and that day discussed Empire migration and foreign affairs.

The return of visits made by the Commissioners in Lunacy for the six months ended December 31, 1936, was laid on the table of the House on January 19.

Silicosis

Replying to Mr. J. Griffiths, on January 19, Mr. LLOYD said that during 1936 there were 552 applications for certificates of disablement received by the medical board under the Various Industries (Silicosis) Schemes from among coal miners in South Wales. Certificates were granted in 268 cases and refused in 253 cases: 311 of the applications were from anthracite miners, of whom 182 were certified and 115 refused. Mr. GRIFFITHS asked if Mr. Lloyd was not aware that these men who had been refused certificates were all disabled in consequence of having inhaled dust in their occupation. He asked if the Government proposed to bring forward a measure to give elementary justice to men who had laid down their lives for their work.

Mr. LLOYD said that the fact that a man was not certified under this procedure did not necessarily prove that he suffered from an occupational form of respiratory disease. He might be only suffering from a form of respiratory disease which might not be due to his employment. The Pulmonary Diseases Subcommittee of the Council recently held a meeting and decided that in the first instance it must come to a conclusion about the essential nature of diseases other than silicosis, from which miners suffered. As a result they had arranged for clinical and radiological tests on the subject.

Malnutrition in Monmouthshire

Mr. SHAKESPEARE informed Mr. Johnston, on January 19, that his attention had been called to the physical condition of children in the boys' school at Blaina. He could not fully accept the head master's statement that 50 per cent. of his pupils were undersized and underfed, poorly clad and badly

shod. He would welcome increased provision of free milk in this and other schools in Monmouthshire, but this provision was restricted by the severe income scale at present in force. This question had recently been discussed with representatives of the local education authority, which was considering the introduction of a more generous income scale.

Mr. JOHNSTON asked whether, if the honourable gentleman could not accept the head master's statement on the matter, he was not prepared to accept the statement made by two of the medical officers of health of the county who re-examined these children in January of this year, and discovered that children of 15 were, on an average, 16 lb. under weight, that forty of the boys were sitting in school with damp feet, and that there was poverty and despair all over the district.

Mr. SHAKESPEARE said that his attention had been called to that report, which did not bear out the statement of the head master. He understood that a fund had been raised to provide boots for the children.

Juvenile Accident Rate.—On January 19 Sir JOHN SIMON informed Sir Percy Harris that the Joint Committee of the Factory Department and the National Confederation of Employers' Organizations on Factory Accidents among Juveniles had drawn up a list of recommendations which had been embodied in a memorandum. The National Confederation had issued this to all employers' organizations, urging them to do everything in their power to enlist the active support and co-operation of all employers in their respective industries in securing a diminution of the accident rate among juveniles.

Effects of Noise.—On January 19 Sir JOHN SIMON, replying to Mr. W. Roberts, said he was informed by the Medical Research Council that it had not received any further report about the effects of noise on the health of the workers from the Industrial Health Research Board, but that investigations were still proceeding. Great difficulty was being experienced in finding suitable opportunities or methods for detecting and measuring any effects which noise might have on the workers.

Medical News

A meeting of the Medico-Legal Society will be held at 26, Portland Place, W., on Thursday, January 28, at 8.30 p.m., when a paper will be read by Dr. H. E. Cox on "Some Forensic Aspects of Dermatitis."

The Third Biennial Child Guidance Interclinic Conference for representatives and professional members of staffs of child guidance clinics in Great Britain has been arranged for January 29 and 30. Sessions will be held at Friends House, Euston Road, N.W., and at British Medical Association House, Tavistock Square, W.C. Admission to the conference is by invitation only. Membership fee 5s. (to include printed report), payable to Dr. D. R. MacCalman, Secretary of the Conference, Woburn House, Upper Woburn Place, London, W.C.1.

The Society of Public Analysts has arranged a joint meeting with the Food Group of the Society of Chemical Industry on Wednesday, February 3, for a discussion on "The Less-known Constituents of Milk and their Examination," which will be held in two sessions, at the Chemical Society's Rooms, Burlington House, Piccadilly, W., at 5.15 and 8.15 p.m.

A conference to discuss the administration of the Milk (Special Designations) Order, 1936, with respect to accredited milk will be held under the auspices of the Royal Sanitary Institute at the Central Hall, Westminster, S.W., on Thursday, January 28, at 2 p.m., when the discussion will be opened by Dr. W. G. Savage.

Lord Horder will give the Friday evening discourse before the Royal Institution, 21, Albemarle Street, W., on February 26, at 9 p.m. His subject is "Old Diseases and New."

The October–December issue of the epidemiological report of the Health Section of the League of Nations is devoted to "Some Recent Advances in the Biology of Trypanosomes of Sleeping Sickness," by Dr. H. Lyndhurst Duke, former director of the Human Trypanosomiasis Institute, Entebbe, Uganda, and a "Geographical Distribution of Human Trypanosomiasis in Africa," by Dr. S. Deutschman, member of the Health Section of the League of Nations.

The issue of the *Wiener klinische Wochenschrift* for January 8 is a Festschrift commemorating the fiftieth anniversary of its foundation.

Dr. L. Haden Guest, secretary of the Leverhulme Research Fellowships, announces that applications are invited for fellowships or grants in aid of research. They are intended for senior workers who are prevented from carrying out research by routine duties or pressure of other work. Any subject which may add to human knowledge may be proposed for a fellowship, but preference is given to subjects in which other provision for research is inadequate. The amount granted will depend on the nature of the research and the circumstances of the applicant. Forms of application, returnable by March 1 at latest, may be had from Dr. Haden Guest, Union House, St. Martin's-le-Grand, E.C.1.

The concerted attempt to put a stop to "jerry-building" includes the setting up of a National House-Builders' Registration Council. This body comprises representatives of building trades employers and operatives, architects, building societies, surveyors, a representative of the Society for the Preservation of Rural England, and a few independent members, including two observers from the Ministry of Health. The only medical member of the council is Dr. J. Greenwood Wilson, medical officer of health for Cardiff, who has written on "jerry-building" in the *Medical Officer* and elsewhere.

Colonel R. J. Blackham, C.B., C.M.G., C.I.E., D.S.O., M.D., has been re-elected a Common Councilman of the City of London for the twelfth year in succession. Since the death of Sir William R. Smith, M.D., Colonel Blackham has been the only medical man on the Corporation of London. It may be remembered that he was chairman of the committee of the Corporation which organized the reception at the Guildhall on the occasion of the Centenary of the British Medical Association.

The National Committee for Mental Hygiene of the United States has awarded a sum of 40,000 dollars to be distributed among clinics, hospitals, and research institutes for the study of dementia praecox.

Dr. Marcel Pinard, senior physician to the Hospital Cochin, Paris, has been elected president of the Société Française de Dermatologie et de Syphiligraphie in succession to Professor H. Gougerot.

Thirty women doctors have recently completed their studies in parachute flying at the Moscow regional parachute school for the purpose of conveying first aid to patients in places unsuitable for the landing of aeroplanes.

Professor A. Bessemans, pro-rector of Ghent University, has been awarded the Saintone prize by the Paris Académie de Médecine for his work on clinical syphiligraphy and the measurement of temperature within the tissues.

Professor Emmanuel Leclainche has been elected president of the Académie des Sciences and Dr. Milian president of the Société Médicale des Hôpitaux de Paris.

During the last eleven years there have been 54,600 more deaths than births in Vienna. In 1934 the decline in the birth rate was as great as its excess in 1910. In March, 1936, 976 children were born in Vienna, while the deaths amounted to 2,219.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, W.C.1.

ORIGINAL ARTICLES and LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone, unless the contrary be stated. Correspondents who wish notice to be taken of their communications should authenticate them with their names, not necessarily for publication.

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The TELEPHONE NUMBER of the British Medical Association and the *British Medical Journal* is EUSTON 2111.

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QUERIES AND ANSWERS

Dermatitis of the Feet

"H. A." writes: A young healthy girl of 17, brilliant at athletics and games, is incapacitated from taking part in these hobbies for long stretches because she gets attacks of acute eczema of the feet after a short run or game in rubber-soled shoes. I wonder if any reader could tell me of a sports shoe with a rope or other sole not likely to bring on this annoying trouble.

Income Tax

Deduction for Board, etc.

"J. F." is entitled under his agreement of service to a gross salary of £500 from which, however, £150 is deducted for board, washing, and laundry. In many cases similar appointments elsewhere are held on terms that the M.O. is entitled to £350 salary, plus board, etc., which is valued at £150. Such M.O.s are in effect receiving the same total consideration as "J. F." but pay tax on £350 only, whereas he is assessed on £500. Is that correct?

⁂ Yes. The question was decided by the Court of Appeal in 1926 in the test case of Machon *v.* McLoughlin. The underlying consideration is that, normally, remuneration received in a form which is not convertible into money is not taxable, and consequently, where the total remuneration consists of a salary plus advantages of that nature, only the amount of the salary is taxable. Consequently M.O.s receiving £350, plus board, etc., are in a favourable position as compared with other salaried taxpayers. Unfortunately for "J. F." and others similarly placed the case quoted above decided that a deduction from a gross salary for board, etc., did not have any effect for income tax purposes, and he is therefore chargeable on the full £500.

Assessment

"LONICERA" was appointed medical superintendent at a salary of £1,200 from October, 1935; previously he had been deputy medical superintendent at a salary of £800. He has been assessed for 1936-7 at £1,200—instead of £1,000 on the basis of his 1935-6 earnings—on the ground that as from October, 1935, he held a new appointment. Is that correct?

⁂ The assessment appears to be legally justified by Section 45 (4) of the Finance Act of 1927, which provides for assessment on the current year's basis where the person first held the office or employment in the year preceding. It is, we think, correct to say that as from October, 1935, our correspondent held a new "office," and that justifies, in law, the application for 1936-7 of the current year's basis. We believe, however, that the provision is not in fact applied when the change in the nature of the appointment is comparatively small, and "Lonicera" might write to the Board of Inland Revenue, Somerset House, W.C.2, stating the facts and asking for reconsideration of the proposed charge.

LETTERS, NOTES, ETC.

Drug Treatment of Influenza

Dr. JOHN T. MACLACHLAN (Dornoch) writes: For many years I have found that 20 grains of sodium salicylate every two hours for five or six doses brought all my influenza cases to an end in twenty-four hours. This treatment is similar to that employed in the early stages of rheumatic fever. But that treatment is useless in pneumonia, which is often confused with influenza. Indeed, if the sodium salicylate treatment in the above doses does not correct the influenza the probability is the case is one of pneumonia. By influenza I mean a disease that starts suddenly with a severe headache, an abrupt rise of temperature, and very severe myalgic pains all over the body, particularly affecting the muscles of the back, which are extremely tender to pressure with the finger, so that the patient starts suddenly on pressing the muscles in the neighbourhood of the scapula. For women the dose should be 10 to 15 grains. English people, in my experience, are more sensitive to drugs than the Scottish, so that the appropriate dose for them is 15 grains for a man and 10 grains for a woman.

Too Much Zeal

An overworked medical man practising in a northern suburb of London sends us a telegram which was delivered to his house at 7.20 a.m. one day last week. The purpose of this message, signed by a firm of manufacturing chemists, was to recommend strongly one of their products "for personal protection and that of patients in present flu epidemic." Our correspondent remarks: "It is to be hoped that the proprietors of the article therein advertised will soon realize that a medical man at a busy time like the present is more likely to resent than to appreciate this new method of forcing their wares on his attention." The same complaint reaches us from other readers.

An Insulin Booklet

Boots Pure Drug Co. Ltd. have issued a new and revised edition of their booklet on insulin in the treatment of diabetes mellitus. Part I deals with the history and properties of insulin, and a description is given of the preparation, testing, and standardization of Messrs. Boots' product. Part II deals with the diagnosis and treatment of diabetes, and contains the line ration diet scheme. Particulars are also given for carrying out urine sugar tests, tests for ketones, and a glucose tolerance test. The booklet concludes with references to the more recent papers and books relating to insulin therapy. Copies may be had on application to the Wholesale and Export Department, Boots Pure Drug Co. Ltd., Station Street, Nottingham.

Dr. Barell's Festschrift

With reference to our review, headed "Modern Drugs" (December 26, 1936, p. 1310), of the *Festschrift* published in honour of Dr. E. C. Barell's forty years' service to Messrs. Hoffmann-La Roche we are asked to say that a few copies of this book are available for the libraries of medical schools and societies. They can be obtained on application to Roche Products Ltd., 51, Bowes Road, N.13, so long as the supply lasts.

A Warning

We are informed that a man in London is passing himself off as a doctor, forging cheques, signing IOUs, and borrowing money from medical men, dentists, and chemists. Medical men are warned against this impostor, and if approached by him should communicate with the police.

Corrections

The obituary notice of Sir David Semple published last week said that he was assistant professor of pathology at Netley in 1904–9. This should have been *1894–9*. Sir David retired from the R.A.M.C. in 1903, and in 1904–9 was working under the Indian Government at Kasauli.

On January 16, at page 145, we published a letter from Dr. W. H. Gossip on the further progress of the patient about whom he wrote in the *Journal* of January 9 (p. 69). In Dr. Gossip's letter "She has had 'fits'" should have read "She has had *no* 'fits.'"